



FRIDAY, JUNE 18, 1897.

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Convention of the Master Mechanics' Association.

The first session of the thirtieth annual convention of the American Railway Master Mechanics' Association, at Old Point Comfort, Va., was called to order at 9 o'clock, Tuesday morning, June 15, by the President, Mr. R. H. Soule.

Col. Henry C. Hasbrouck, U. S. A., was introduced, and addressed the meeting in behalf of the military authorities at Fort Monroe.

PRESIDENT'S ADDRESS.

This was followed by the address of President Soule, which reviewed the work of the association since the beginning, and called attention to the progress made within the past few years in locomotive building. The steam pressure which gives the maximum efficiency for single-expansion engines has been found to be 180 lbs. per square inch. Piston valves are growing in favor, and considerable improvement has been made in reducing the weight of reciprocating parts. For freight engines the cylinders and drivers are being increased in diameter, while for high-speed locomotives the valves are now generally being set with decreased lead and increased clearance. The proper lubrication of cylinders and valves has within the year been closely studied, with the effect that already improvements have been made in locomotive lubricators, which promise to overcome the failings of the old-style lubricators.

The practice of rating locomotives on a tonnage basis has been adopted by the leading railroads. American locomotives are larger and more powerful than those used in any other country, and have shown fair economy, the following being a comparison of the working of different types of steam engines:

	Lbs. of coal per horse-power per hour.
Stationary engines.....	1.48
Marine engines.....	1.31
Locomotive engines.....	2.5

The compound locomotive is still in the balance, but it is receiving careful attention and a number of roads are now using compounds in freight service and a smaller number of compound locomotives are used in passenger service.

Railroad shops are fast being equipped with improved machines and tools for locomotive repairs and renewals.

During the year the American Society of Steel Manufacturers has adopted the standard gage which originated with the Master Car Builders' and Master Mechanics' associations. Courses and lectures in railroad engineering are being started at some of the Western technical schools. The effect of the forced economies, on account of the hard times within the past few years, has been to make better men of those engaged in railroad work, and the advantages gained by a careful system of reports and records are now more generally recognized.

The various railroad clubs throughout the country have done much good work which has greatly facilitated the work of the annual conventions. Mr. Soule, therefore, suggested that in the future it would be best to hold both the Master Car Builders' and Master Mechanics' meetings during the same week. It was further recommended that in the appointment of committees, in the future, members who are to serve on the same committee be selected with reference to their being able to meet conveniently at some central point; also, it was recommended that a committee be appointed to report at the next meeting on the subject of "The Use of Electricity for Motive Power Purposes."

The reports of the Secretary and Treasurer were read and referred to the Auditing Committee, Messrs. G. R. Henderson, T. A. Lawes and Angus Sinclair. The Treasurer's report showed a balance of \$1,659.01. Mr. O. Stewart, who has filled the office of Treasurer for the

past 10 years, offered his resignation, which will come up at the time of the election of officers.

Mr. G. W. Prescott and Mr. W. H. Stearns were elected honorary members. The present membership is 620.

A communication was read from Mr. H. Schlacks, Superintendent of Machinery of the Denver & Rio Grande, in which he showed that a statement made by Mr. Angus Sinclair and printed in the *Proceedings* for 1896 was incorrect. The statement was regarding the failure of a large number of radial stay boilers on the Denver & Rio Grande. Mr. Sinclair acknowledged that he had made an error, and the communication with Mr. Sinclair's statement were ordered printed in the *Proceedings*.

It was decided that hereafter there would be but eight subjects presented for topical discussion.

A resolution was passed that the next meeting be held during the same week as that of the Master Car Builders' Association and that the Executive Committee confer with the officers of the M. C. B. Association as to the time of meeting.

A motion was carried to the effect that at the next meeting some prominent railroad engineer or college professor deliver a lecture at such time as the Executive Committee should deem suitable.

It was decided to appoint a committee to report at the next meeting on the subject of the "Advisability of Adhering to the Standard Square Bolt Head and Nut."

The following topical subjects were discussed: Mr. G. R. Henderson presented a discussion of the subject, "Piston Rod,—Best Design and Material," and Mr. W. S. Morris discussed the subject, "Compound vs. Simple Locomotives."

The regular committee report on "Exhaust Nozzles and Steam Passages" was discussed by several members and the subject was carried over until the next meeting for further discussion.

Abstracts of most of the committee reports follow:

COUNTERBALANCING LOCOMOTIVES.

The Committee designated the following roads to confirm or disprove our recommendations in report submitted at the 1896 meeting: [Eleven in all.] Of these 11 roads only four have reported, viz.: Pittsburgh, Cincinnati, Chicago & St. Louis, Northern Pacific; Chicago, Burlington & Quincy; Louisville & Nashville.

In every case the report has been favorable, all concurring in the opinion that the engine tested rode at least equally well when balanced by the rule recommended as by the usual rule of balancing two-thirds of the reciprocating weights, regardless of the weight of the engine. The engines tested were of different types, from 8-wheel, mogul and 10-wheel engines in fast mail and passenger service to heavy consolidation engines in fast freight service. In order, if possible, to be able to present more data than could be obtained from the roads designated, requests for information of the action of engines balanced in accordance with the rule recommended by the committee were sent to forty-five other roads; nineteen replies were received, of which only six have tried the committee's method. In none of these were any bad results reported from the use of the rule recommended, two reporting that a larger proportion of the total weight of the engine than $\frac{2}{3}$ could be taken as the allowable weight of the reciprocating parts on each side which could be left unbalanced. One member reports $\frac{3}{4}$ as giving good satisfaction in an 8-wheel engine in fast passenger service. Another recommends using the rule recommended by this committee for short engines and increasing the unbalanced weight in proportion to the length of the engine. From the result of actual tests on a number of different roads with different kinds of locomotives, and the further fact that the rule recommended coincides almost exactly in many well-designed engines with the method of counterbalancing long in common use and has received the indorsement of every road which has tried it, your committee has to report that the results obtained show that the principle upon which the rule is based is correct, and indicate that if the proportion of unbalanced weight allowed is incorrect it is on the safe side or too small, and that in any except very high-speed engines a larger proportion of unbalanced reciprocating weight might safely be allowed.

The recommendations of the committee might be criticised because the greater unbalanced reciprocating weight throws greater stresses on the frames and adjacent parts. The stresses from which the track is relieved by increasing the unbalanced weight of the reciprocating parts, are, of course, thrown upon the frames and other parts of the engine itself. It is readily shown, however, that the stresses from the amount of unbalanced weight allowed by the rule recommended at the assumed maximum speed of as many miles per hour as the diameter of the drivers contains inches, will be only one third or one-fourth, in ordinary types of locomotives, of the stresses thrown upon the frame by the pressure exerted by the steam against the piston. Furthermore, the greatest stresses from the reciprocating parts come at the part of the stroke when those from the steam are the least, that is, at the end of each stroke when steam is being exhausted. There is, therefore, no reason to apprehend any difficulty on this account.

The practicability of allowing a greater amount of reciprocating weight to remain unbalanced in long than in short engines, as suggested in the discussion of last year's report, has been considered. This is being tried by one road—the Great Northern—which reports, thus

far, favorable results, although its experience is as yet limited to a small number of engines in service but a few months.

Your committee renews its recommendation contained in last year's report, which has been worded differently to correct an ambiguous sentence in the second part of the rule.

First.—Divide the total weight of the engine by 400; subtract the quotient from the weight of the reciprocating parts on one side, including the front end of the main rod.

Second.—Distribute the remainder equally among all driving wheels on one side, adding to it the weight of the revolving parts for each wheel on that side. The sum for each wheel, if placed at a distance from the driving wheel center equal to the length of the crank, or a proportionally less weight if at a greater distance, will be the counterbalance required.

The members of this committee are Messrs. E. M. Herr, S. P. Bush, W. H. Lewis, C. H. Quereau.

TRUCK SWING HANGERS.

Your committee appointed to advise the proper angle of swing beam hangers in locomotive trucks submitted a report at the meeting of the Association held in Saratoga in June of last year. Quoting from this report:

"Now the function which a swing-motion truck should perform is to be able to move sideways, but in doing so it should exert a pulling action in that direction on the front of the engine, somewhat in excess of the resistance to such movement. It must be admitted by the committee that they have little definite knowledge in relation to the amount of this resistance, and they suggest that the determination of the lateral force which must be exerted to guide the front end of a locomotive on curves offers an inviting and probably a profitable field for experimental investigation."

Mr. William Garstang, Superintendent of Motive Power of the C. C. & St. L. Railway, made quite elaborate tests with a view to throwing light on this subject. A dynamometer was constructed and attached to the truck axle of a mogul engine. [Details of the application of the dynamometer and the results observed are given in the report.]

Hangers which have an angle inside of an inch either way from the vertical, by reason of the small angle, seemed to allow the boiler to sway to its maximum position and back again to extreme in other direction, this surging tending to raise the stress on truck wheel flange and speaks for itself in the tabulated results.

Hangers whose angle exceeds this in either direction absorb a part of this sway, and consequently show a reduction of truck stress. The hangers giving the best results, namely, showing the least boiler swing and least stress on the truck wheel flange, were the hangers whose points of suspension are closer together than the suspending points on the center casting. The length of hangers bears an important relation to stress indicated. For instance, the two lengths of hangers used in these tests, one of which was 8 in. and the other 6½ in. long, at the 18-deg. angle, suspended as before mentioned, showed results which would indicate that the hanger whose arc is of the shortest radius in a given length of movement, and necessarily has the greatest middle ordinate, tends to raise the engine more abruptly and suddenly, thereby absorbing a greater percentage of stress and reducing the flange stress in a corresponding ratio. This shows to be in favor of the short hanger, but just what length would be the mean was not determined.

The angles giving the best results for the two hanger in this test were 18 deg. for the 6½-in. hanger and 28 deg. for the 8-in. hanger, which leads the committee to believe that the angle of the hanger should be changed for each length of hanger used.

Your committee feels that sufficient information has not been secured to enable them to answer conclusively the questions propounded. To do so will necessitate making a series of tests with the different types of engines under different conditions as to gage, etc., and if the Association feels that it is desirable to pursue this investigation further, it would be advisable to set aside a sufficient amount of money to defray the expenses of making such tests. The members of this committee are Messrs. G. L. Potter, M. N. Forney, W. Garstang, W. Lavery, John Mackenzie.

LOCOMOTIVE GRATES.

It appears to your committee that a grate should be composed wholly of cast-iron skakers for fire boxes not over the drivers. For wide fire boxes, those extending out over the drivers, using lump coal, transverse skakers alone, or longitudinal skakers lightened with water tubes between, are recommended. For wide fireboxes over the drivers using small coal, skakers appear to be preferable in whole or in part.

[The report is 36 pages, giving in much detail, with engravings, giving designs of grates and their parts and results of use and tests. Most of this must be put off for another issue.]

The Ontario finds that a fire can be cleaned upon shaking grates in one-fourth the time taken upon water tubes. This is a usual experience.

Cheap coal can be better used upon shaking grates because the great amount of ash and refuse is easily removed while running. One branch division uses coal of even 27 per cent, ash upon passenger engines with fireboxes between frames and with skakers.

Economical use of coal is reported by the Erie, Lehigh Valley and Pennsylvania, due to less loss by dropping through the grate and less loss when cleaning fire. The opinion of the New York, Ontario & Western had been that there was a considerable saving by the use of shaking

grates over water bars under like conditions of coal, service and engine crew; but the series of tests which have been carried on by the committee, made possible by the kindness of the above road, have not demonstrated this saving. There is more difference in crews than in grates.

Test 1 was with slaty lump coal upon 25½ sq. ft. of grate between frames. The runs were 77 miles in length, with four passenger cars, at an average speed of 32.9 miles per hour. Each engineman made 10 runs with Engine 73 and six runs with Engine 78. The following are the average results:

	Engine No. 73. Shaking Grates.			Engine No. 78. Water Grates.		
	Crew No. 1	Crew No. 2	Average	Crew No. 1	Crew No. 2	Average
Pounds coal per mile	15.7	14.	14.8	16.4	14.8	15.6
Pounds water per pound coal	5.1	5.2	5.15	5.	5.4	5.2
Pounds coal used in cleaning fire	458.	407.	432.	460.	366.	413.
Maximum boiler pressure	60.	100.	143.	75.	75.	145.
Minimum boiler pressure	131.4	132.	131.7	124.6	126.	125.3
Average boiler pressure	81.	72.4	76.7	84.6	76.5	80.6
Coal per square foot grate per hour, used while running						

Test 2 was with fine anthracite upon 80 sq. ft. of grate over drivers. Eight freight runs of 77 miles each were made by each engine at an average speed of 14.5 miles per hour. The following are the average results:

	Engine No. 165. Shaking grates.	Engine No. 152. Water grates, with cast-iron filling pieces.
Pounds coal per car-mile	5.56	5.38
" water per pound coal	4.56	4.43
Average number of cars	26.	27.
Maximum boiler pressure	157.	155.
Minimum boiler pressure	120.	115.
Average boiler pressure	145.9	142.8
Coal per square foot of grate per hour	26.2	26.3

The Erie reports that "for lump anthracite the shaking-grate surface between drivers should be at least from 16 to 18 in. below the firedoor, and it is desirable to have a downward slope toward the front of about one inch per foot. With anthracite coal the depth of the fire carried is dependent upon the size of the lumps used. The Delaware, Lackawanna & Western replies that with lump coal in fireboxes between drivers the depth at first can be no thinner than 7 in. or 8 in., and this gradually deepens during the run. It found that increasing the slope of these water-tube grates from ¾ in. and ½ in. to one inch in 12 in. gave a better distributed draft.

For fireboxes over drivers using fine coal on tubes and filling pieces the depth of fuel is seen from the following replies: Delaware, Lackawanna & Western—"It is very light at first, about 2 in., which of course increases. By judicious light firing, the fire cleans itself, the coals being kept dancing uniformly in all parts of the fire"; New York, Ontario & Western—"Impossible to get over 8 or 10 in."; Delaware & Hudson—"We carry about 12 in."

The rate of combustion per square foot of grate averages less for anthracite than for bituminous, appearing much like the English rate for bituminous. The water evaporation per pound of even the best lump anthracite, when least forced, falls below fair bituminous performance.

The Pennsylvania sends results of tests, Table I, made upon the New York Division with the latest design of eight-wheel passenger engine, burning lump anthracite upon 33 24 sq. ft. of shaking grate on top of frames, as per Plate II.

	Lbs. per sq. ft. grate per hour.	Corresponding evaporation lbs. of water per 1 lb. coal.
Maximum	84.8	5.82
Minimum	54.8	6.38
Average	67.5	6.08
Average number of cars		5.88
Average speed, miles per hour		45.34
Average coal per car-mile, pounds		8.42

For efficiency, this table should be compared with tests made upon the New York, Ontario & Western.

For comparisons of the rate of combustion—with regard to the service, style of firebox, style of grate, and size of fuel, on different roads—Table II. is given. For figures under most like conditions it should be read horizontally, though on any one road it may be read vertically if it is desired to know how consumption varies with different coal and grate in the same service.

The data for the Delaware, Lackawanna & Western were taken from performance sheets of total coal per run, speed not given. The coal per locomotive mile was for lump, 100 lbs. maximum and 63 lbs. minimum; for fine coal, 100 maximum and 47 minimum. The coal was divided into pounds per square foot grate per mile by the following dimensions given for grate area:

	Freight.	Passenger.
Between frames	24	29
On top of frames	32	36
Over drivers	76	80

Pounds per square foot grate per hour were computed for assumed speeds of 15 miles per hour for freight and 30 for passenger. The first two columns are therefore of chief value for reading vertically. It is probable that the 20 lbs. and 9 lbs. result from too low an assumed speed.

Anthracite vs. Bituminous:

The following reply gives for comparison the averages of 30 Erie engines using hard and soft coal on entirely shaking grates of the same type:

	Freight.	Passenger.
Hard Coal:		
Average pounds per mile	122	112
Average cars per draft	17 3	7
Soft Coal:		
Average pounds per mile	120	110
Pounds hard coal, per freight car mile	7.05	7.06
soft	6.06	6.06
Average cars per draft	18.15	16
Pounds hard coal, per passenger car mile	15.07	15.07
soft		

The members of this committee are Messrs. H. Wade Hibbard, George W. West, David Brown and Edward L. Coster.

TABLE II.—Pounds of Anthracite per Square Foot Grate per Hour.

		Delaware, Lackawanna & Western.		Delaware & Hudson.		New York, Ontario & Western.		Pennsylvania.	
		Freight.	Pass.	Freight.	Pass.	Freight.	Pass.	Freight.	Pass.
		Computed for 15 m. p. h.	30 m. p. h.	Computed for 15 m. p. h.	30 m. p. h.	Computed for 15 m. p. h.	30 m. p. h.	Computed for 15 m. p. h.	30 m. p. h.
Coal, lump. Firebox, between frames.	Freight	Max. 63 w	Min. 39 w	Max. 45 w	Min. 32 w	Max. 75 s	Min. 55 s	Max. 85 s	Min. 68 s
	Passenger	Max. 103 ws	Min. 65 ws	Max. 75 s	Min. 55 s	Max. 85 s	Min. 68 s	Max. 85 s	Min. 68 s
Coal, lump. Firebox, on top of frames.	Freight	Max. 47 w	Min. 30 w	Max. 83 ws	Min. 40 w	Max. 25 w	Min. 18 w	Max. 26.2 s	Min. 26.3 s
	Passenger	Max. 53 ws	Min. 25 w	Max. 46	Min. 18 wf	Max. 26.2 s	Min. 26.3 s	Max. 26.2 s	Min. 26.3 s
Coal, fine. Firebox, over drivers.	Freight	Max. 20 wf	Min. 9 wf	Max. 34 wf	Min. 21 wf	Max. 46	Min. 18 wf	Max. 26.2 s	Min. 26.3 s
	Passenger	Max. 38 wf	Min. 18 wf	Max. 46	Min. 18 wf	Max. 26.2 s	Min. 26.3 s	Max. 26.2 s	Min. 26.3 s

w = water grates only.
s = shaking grates only.

wf = water tubes with filling pieces.
ws = water tubes with shaker fingers.

THE APPRENTICE BOY.

The first question to be considered is the length of term of service which an apprentice should serve. On this subject there are two diametrically opposed views. From reports received it is evident that the more general custom is the prescribing of a definite length of service. On the other hand, what the committee will call the merit system is in force in some shops whose practice we all recognize ought to command our highest respect, also the practice in other countries is in favor of the merit system as opposed to a rigid term of service, and in the discussion in the Western Railway Club, at the May meeting, the majority of opinion was distinctly in favor of the merit system.

With this understanding the committee submits herewith a schedule for machinist apprentices, which is in use on the Norfolk & Western Railroad, and which has been found very satisfactory:

	Apprenticeship Course.	Months.
Tool room	General use of tools, names, etc., work on small planer, drilling machine, shaper and lathes, provide tools	6
Erecting shop	Helping on general work	3
Machine shop	General instructions, milling machine, boring mill, horizontal machine, axle lathe, and helping in general	3
	Boring, driving and truck brasses and quaterning machine	2
	Cylinder boring machine and planer	1
	Rod gang	3
	Small lathe (alone)	2
	Large slotter	1
	Brass lathe	2
	Small planer	1
	Large and small planers	2
	Driving wheel lathe	1
	Large lathe (alone)	2
	Motion work lathe	1
	General vice work	3
	Surface table	3
Erecting shop	General work	12
Total		48

Very little attention seems to have been given to the outlining of a systematic course in the blacksmith shop. Your committee believes that the course of training in the blacksmith shop should be just as carefully supervised and directed as that in any other department, and submits a blacksmith shop course covering four years.

Much the same comments as to the general lack of system and rule apply in the case of the boiler shop. Again, the committee believes that the course should be definitely marked out and carefully supervised. As a basis for such a course, subject to the aforesaid qualifications, your committee submits a boiler shop course of four years.

Your committee would also recommend a general code of rules and regulations governing the relations of the company to all apprentices.

Your committee now comes to what it considers to be the most important point in the matter of the handling of apprentices. Your committee not only believes, but insists, that the charge of apprentices should be given to one particular and qualified person, that person to be known as the Foreman of Apprentices or by some such title. This practice is followed in other countries and is undoubtedly satisfactory. Your committee knows no

other way of insuring the proper attention being given to apprentices without great waste of somebody's time.

Your committee recommends that a standing committee on this subject be appointed, and that that committee be empowered to enter into whatever correspondence may seem necessary with the managements of railroad companies, with a view to securing the proper treatment of apprentices and the acquiescence of the managements in the appointment to a necessary foreman and other matters, and that the committee also be given power in behalf of this association to negotiate definitely with universities or institutions of learning for the establishment of courses in specified districts, as they may see fit, without waiting, if the committee deems right, for the approval of next year's convention.

The members of this committee are Messrs. W. F. Bradley, W. H. Harrison, G. R. Joughins, A. E. Manchester, H. P. Robinson.

BEST METAL FOR CYLINDERS, VALVES AND VALVE SEATS.

The subject involves two considerations, one being the strength of material in a casting of the shape of a locomotive cylinder; the other is the question of friction between lubricated surfaces.

The question of the strength of locomotive cylinders is extremely complicated. The tendency of a cylinder to break is only partially dependent upon the strength of the material of which it is composed. The form, the pattern and the shrinkage of the material from which the casting is made are the points upon which the tendency to breakage most largely depends. As to the form of the pattern, it is almost unnecessary to state that all angles, external or internal, should be carefully avoided. Owing to the fact that strains from shrinkage cannot be entirely avoided, the question of the shrinkage of the metal from which the casting is made becomes of paramount importance. The various kinds of pig iron differ materially in this respect, and in the same brand of pig iron the amount of shrinkage varies materially with the grade of the iron, the rule being that the higher the grade or the harder the iron the greater will be the shrinkage of the casting made therefrom. If we are simply interested in obtaining a cylinder with the least amount of shrinkage, and consequently with the smallest amount of internal strain, we should select the soft metal. It is, however, a fact that in cast iron the ultimate strength increases with its hardness. As will be seen, it is necessary to consider the question of hardness directly in connection with that of shrinkage. The metal composing the cylinder must be soft enough so that the boring and planing operations can be properly performed.

The easiest and most accurate way of determining the hardness of a metal is to pour from the metal a chill test—that is, to pour a small casting so that a portion of the casting is formed against an iron chill. Unless iron is extremely soft there will be found on breaking the casting a certain depth of white iron formed against the chill, and the depth of this white iron will vary directly as the hardness of the metal from which the casting is made. If a casting is made from a metal for which the chill test shows a depth of about ½ in. of white iron, the casting can be comfortably worked on the planer and boring machine. If, however, the chill test shows a depth of ¾ in. white iron, it can be worked with considerable difficulty, although when wheels are made with a metal of this hardness, or even harder, they can be bored with reasonable facility. This, however, depends also upon the brand of metal which is used. With certain mixtures of iron a chill test showing ½ in. will indicate a casting which is very difficult to work; but without going into these fine details, a chill test of ½ in. white iron will give a casting, which in the shape of a cylinder

der can be satisfactorily put through the ordinary machining operations. If the iron chills materially deeper than this, the difficulty of machining will be so great as to condemn the casting. Even if the casting could be machined, the excessive shrinkage of such hard metal would cause serious trouble from cracking of the cylinders in service.

When we consider the question of friction, both in the case of the cylinder itself and the valve seat, there seems to be no reason to hesitate in saying that the harder the wearing surface the better the results, both as to wear and frictional resistance. This is undoubtedly true within the limits of a cylinder casting, and is possibly true within any limit. The problem, therefore, in the case of a cylinder composed of one piece narrows itself down to that of providing the hardest possible cylinder consistent with the necessary freedom from breakage, and with machining requirements.

In the matter of mixtures of iron for cylinders, the accompanying statement gives a summary of replies received from members of this association. As to hardness, those who specify uniformly require the casting to be as hard as can be worked, with the exception of two who require that the mixture shall chill $\frac{1}{2}$ in.

Your committee would recommend that members who have the facilities make further tests on chill, shrinkage and strength, and, to secure uniformity, recommends dimensions as follows:

The chill test shall be 6 in. in length and 2 in. square in cross sections, one side 2×6 in. to be cast against a smooth cast-iron chill not less than $1\frac{1}{2}$ in. in thickness and 6 in. square.

The shrinkage test shall be 24 in. in length between the chills forming the ends and $1\frac{1}{2}$ in. square cross-sections.

The strength shall be the shrinkage test above described.

In the matter of metal for valve seats, the question is—"Should the metal for valve seats be the same or different?"

A number of tests have been made of brass slide valves, and so far as your committee have been able to ascertain, the results have been unsatisfactory as compared to cast iron, both as to frictional resistance and wear. Your committee cannot do better on this point than to quote from Joshua Rose as follows: "Cast iron in some situations is far more durable than hardened steel; thus when surrounded by steam it will wear better than will any other metal. Thus, for instance, experience has demonstrated that piston rings of cast iron will wear as smoothly, better and equally as long as those of steel, and longer than those of either wrought iron or

Reports from Members on Cylinder Mixtures.

Road.	Charcoal iron.	Coke iron.	Car wheel scrap.	Soft scrap.	Scotch pig.	Steel.	Tensile strength.	Chill.
Fall Brook	25	25	50	50	50	50	lbs.	.....
Can. Pac.	No. 2	33%	33%	33%	33%	33%	30,300	.....
B. & O.	25	33%	33%	33%	33%	33%	30,300	.....
L. V.	25	33%	33%	33%	33%	33%	30,300	.....
U. P.	35	35	35	35	35	35	30,300	.....
N. & W.	No. 2	33%	33%	33%	33%	33%	30,300	.....
B. & O. S. W.	31	31	31	31	31	31	30,300	.....
So. Pac.	25	33%	33%	33%	33%	33%	30,300	.....
L. & N.	25	33%	33%	33%	33%	33%	30,300	.....
D. L. & W.	25	33%	33%	33%	33%	33%	30,300	.....
L. S. & M. S.	50	50	50	50	50	50	30,300	.....
C. M. & St. P.	50	50	50	50	50	50	30,300	.....

brass, whether the cylinder in which it works be composed of brass, steel, wrought iron or cast iron; the latter being the most noteworthy, since two surfaces of the same metal do not as a rule wear or work well together. So also, slide valves of brass are not found to wear so long or so smoothly as those of cast iron, let the metal of which the seating is composed be whatever it may; while, on the other hand, the cast-iron slide valve will wear longer of itself and cause less wear to its seat, if the latter is of cast iron, than if of steel, wrought iron or brass.

If greater hardness is desired in the wearing part of the cylinder and valve seats than is consistent with the strength of the body of the cylinder, the same can be secured by the use of bushings and false valve seats, and this course is recommended by a number of members.

In conclusion, your committee recommends:

1. That as a rule, cylinders should be as hard as is consistent with machining requirements.
2. That the matter of shrinkage should receive close attention in making cylinder mixtures.
3. That members having the facilities should make systematic tests of the hardness, shrinkage and strength of metal used in cylinder castings and supplement the same with chemical analyses.
4. That valves should be of cast iron.

The members of this committee are Messrs. J. N. Barr, chairman; G. F. Wilson, G. W. Stevens, F. W. Morse, H. Tandy.

BOILER JACKETS.

Your committee appointed to report upon the question, "Which is the most economical, a boiler jacket of planished iron, or a boiler jacket of common sheet iron, or sheet steel painted? The general appearance, first cost and cost of maintenance to be considered," presents the questions contained in their circular of inquiry, together with a synopsis of the replies received to the same.

From a careful consideration of the foregoing, your committee concludes that it is more economical to use boiler jackets of common sheet iron, or sheet steel painted, than it is to use jackets of planished iron.

The members of this committee are Messrs. T. B. Purves, Jr., C. G. Turner, A. E. Mitchell, J. E. Sague, Edward L. Coster.

RATIO OF GRATE AREA, HEATING AREA AND CYLINDER VOLUME.

[This report is long and elaborate, with numerous important diagrams and tables. The conditions are analyzed with much care and ability and the report is of permanent value not only in the results reached but as an example of methods of investigation. We can give now only the introduction and the conclusions reached. We shall probably give further details of the report later. —EDITOR.]

The proper ratio of heating surface and grate area to cylinder volume for passenger and freight engines, whether burning anthracite or bituminous coal, and the ratio which should exist between the size of cylinder and length of steam port, were the problems given to this committee, which soon found that the report, if properly presented, would require much work and study, as well as assistance from various members of the association in the way of furnishing information. A circular of inquiry was promptly sent out, which would enable your committee, if answered to make comparisons between these engines, operating under different conditions, which were known to give satisfactory steaming results, and those which did not. It was, however, decided, that if the proper reliable data could be secured, it would be extremely valuable to introduce an analytical determination of the points in question, and to compare this with the practical results as given by the answers to the circular. As the times did not seem propitious to request anyone to make experiments for this purpose, it was decided to confine ourselves to the results of such tests as had already been made by reliable parties, if we could obtain the necessary information through such channels. Many personal letters were written to roads (both American and European) who were known or supposed to have the desired records, but such few responses were secured that your committee was compelled to depend almost entirely upon its own resources and the very meager information at its disposal, and therefore makes this explanation in order to forestall any criticisms (just or unjust) relative to the fact that an elaborate superstructure had been built upon an insufficient and weak foundation.

In order to present an analytical discussion of the question, it was necessary to determine approximately the following points:

1. The force necessary to move a train of a given weight at various speeds and accelerations over various grades and curves.
2. The ratio of mean effective pressure in the cylinders to initial pressure, for various speeds, cut-offs and lengths of steam port.
3. The ratio of cut-off pressure to initial pressure for various speeds, cut-offs and length of steam port.
4. The evaporative value of different fuels at various rates of combustion per square foot of heating surface.
5. The evaporative value of different fuels at various rates of combustion per square foot of grate area.

It will be at once recognized that if we are able to satisfactorily determine these various points, the proper heating surface and grate area needed by a locomotive for doing a definite amount of work can be readily calculated. The solution of these requirements gave your committee the greatest amount of work.

Conclusions.

After a careful study of the foregoing data, your committee has reached the following conclusions:

The ratio of grate area in square feet to total cylinder volume in cubic feet should not be less than:

- 4 for large anthracite coal,
- 9 " small "
- 3 " bituminous "

for simple passenger or freight locomotives.

The ratio of heating surface in square feet to total cylinder volume in cubic feet should not be less than:

- 180 for large anthracite coal,
- 200 " small "
- 200 " bituminous "

for simple passenger or freight locomotives.

(The proportion for compound locomotives must be figured out by taking the volume of the high-pressure cylinder or cylinders and the desired cut-off in high pressure cylinder, and calculating as in formula 4.)

The ratio of heating surface to grate area should not be less than:

- 40 for large anthracite coal,
- 20 " small "
- 60 " bituminous "

for passenger and freight locomotives.

For coke and fuel oil, the proportions for bituminous coal may be observed.

The ratio of firebox heating surface to total heating surface should be about 10 per cent.

The ratio of tube length to outside diameter should not be less than 70, and may be as much as 90.

The ratio of steam port length in inches to cylinder area in square inches for passenger locomotives should be preferably about 10 per cent. This can be accomplished either by using piston valves or Allen valves. In the latter case the Allen valve has been considered as doubling the length of the port. In freight locomotives, which normally make less revolutions, the ratio may be from 5 per cent. to 8 per cent.

Finally, your committee wishes to state that their de-

ductions and calculations must always be used with discretion, and in every case the locomotive should be designed for the work it has to do, not merely accepting these general formulæ (4 to 12) for all varieties of service without modification. The first portion of the report indicates how to proceed with such calculations in detail. To show that this is important, we quote from a letter received from the chief engineer of a prominent transcontinental line, suppressing his name, however, as he was courteous enough to write plainly to us:

"The ——— Railroad has made some elaborate experiments in order to determine freight train resistance, but has not yet extended the trials to passenger service. The general data, while used for grade reductions and engine ratings, have not been fully tabulated; accordingly, I am not able at this time to give you the results, which I regret.

"I may say in advance, however, that the experiment showed our engines to be very deficient in steaming power in all cases where they were called upon to overcome high resistance, at speeds over 12 or 15 miles per hour, and we have ascertained on many of the divisions of high resistance that the train length is determined by the ability of the engine to develop horse-power, and is almost independent of the weight on the drivers.

"All divisions of continuous rise, as in the valley sections, show abnormal horse-power requirements for speed over 20 miles per hour and in ordering engines for such sections in the future, we shall specify much higher evaporative requirements than heretofore.

"I cannot comply with your request to fill in the attached circular, regarding the engines which do not steam well, as my statement practically applies to all engines on our road, when working under conditions to which they are not adapted. . . . We conclude, from our recent experiments, that an engine must be adapted as nearly as practicable to the division to which it is assigned. For example: We have two divisions upon which the ruling maximum rate of grade is the same, taxing adhesion to the same extent in both cases. In the one case, however, the grades are undulating, while in the other we have an average rise per mile of about 11 ft. In the first case, while adhesion is taxed to the limit, on the intermittent sections of maximum grade, the tax on the boiler is obviously limited to the horse-power required to move the train at schedule speed against the average rolling resistance only, and the grade resistance may be neglected in computing the horse-power requirements, as the required momentum of the train on light grades or in sags constitutes an addition to the power of the engine in assisting the train over the rises, and the draft on the boiler on down grades is small.

"In the second case, the engine has to overcome the same rolling resistance, plus the work done against gravity in rising continuously 11 ft. per mile, and if the speed is the same, the work done in horse-power hours over the same distance is very much higher—in this particular instance about double.

"With steam-making capacity unchanged, it is quite certain the speed must be reduced one-half to haul the same train, or the resistance decreased one-half to haul the train at the same speed. This latter alternative, of course, means a shorter train. Maintaining the train length constant may result in a schedule unduly slow, and in such cases it is the universal practice to shorten the train length sufficiently to make the arbitrarily established schedule time. In our own case, this has led to a reduction in the train length of 10 cars, as the same engine, at the same rate of speed, can furnish steam to haul 35 cars over the undulating division and but 25 cars over the division of continuous rise. In the first case the adhesion is fully taxed at infrequent intervals, on the maximum grades, whereas, in the second case, the adhesion is not fully utilized at any time.

"To sum up, the weight on drivers should be proportioned to the maximum rates of grade, while the steam-making capacity should be proportioned to the average resistance and schedule speed, as an engine of given weight on drivers, designed to develop a given horse-power, would utilize its full adhesion, under favorable conditions, while under other conditions it would utterly fail to develop sufficient horse-power to utilize even 50 per cent. of the adhesion due to weight on drivers. We therefore expect to provide engines of greater horse-power for the same weight on drivers, for divisions of high resistance, than are provided for divisions of low resistance."

The members of this committee are Messrs. G. R. Henderson, A. S. Voght, R. Wells, S. M. Vaulchain, C. J. Mellin.

PIECEWORK IN LOCOMOTIVE SHOPS.

Your committee, appointed to report on the advisability of "Piecework in Locomotive Shops," issued a circular of inquiry, to which there have been 41 replies.

[These we omit for the present.]

From the foregoing, and from the fact that the value of any employee is in direct proportion to the amount and quality of the output resulting from his efforts, it is, in the opinion of your committee, the most just and equitable method of employing men, as by this means the man who is skilled and industrious reaps the benefit of all the energy and brains expended, and is not put upon a level with one of inferior capacity, or the time server, while both he and his employer receive just what was agreed upon, and if there is a spirit of justice in the setting of prices, there will be no hardship on either side, and these prices should be based upon the average, both as to men and conditions. Even on new work it would be remarkable if there was no variation in the output by the same man, and in repairs, especially where old parts have to be separated, there is a great variation, and in the opinion of the committee the setting of prices should have the same consideration that a competent foreman would give where there are no prices affixed. Such a foreman certainly knows just how long a man should be upon any piece of work, and, failing to obtain proper results, should call the workman to account, and it is in just the extent that a man's pocket is a more inexorable taskmaster under the piecework system than the average foreman, that we may expect better results than would obtain under a competent foreman who had the authority to base a man's pay upon the results of his labor.

The averaging of pay has been one of the curses of the daily wage system; there has been no particular incen-

tive for one man to excel another, and it has drifted into an average day's work for an average day's pay. Another thing under the wage system that about offsets the danger of a lack of thoroughness under the piece system, is the tendency to expend unnecessary labor on a piece after it is good enough for the service it is intended for. This, in our opinion, accounts for a large percentage saved under the piece system, as it is to the interest of the employee to stop when he gets through any other, and by so doing receives much more wages than his co-laborers, there is no justice in reducing him to the average, even if he is the only one on that particular job in the shop, as the company pays no more per piece than it would pay to another, and, in case of a machine hand, obtains a benefit in the greater output of the machine. If we could increase the output of machinery or shops the 25 per cent. claimed for this system, and reduce our plants or increase our facilities that much, that alone would be quite an object, even if we did not get any benefit in the ultimate cost of the labor. This certainly would mean 25 per cent. less time for equipment in shops and a saving all around, and as, so far as the committee is informed, this question is "with but few exceptions, most heartily indorsed by those who have tried it most extensively, the committee considers that its investigation warrants it in most heartily recommending its adoption, and this is fully in accordance with the experience of those members of the committee who have had considerable to do with piecework.

The members of this committee are Messrs. P. Leeds, Wm. Swanson, R. P. C. Sandersen, J. G. Neuffer, J. B. Michael.

SHOP MOTORS—STEAM, AIR, ELECTRIC.

The committee sent out a circular asking numerous questions as to the use of motors—their type, size, cost and efficiency.

Replies were received from 24 railroads and one locomotive builder, reporting 36 steam motors, 172 air motors and 229 electric motors.

The Baldwin Locomotive Works reports in service 27 steam motors and 230 electric motors.

The committee finds a lack of data as to the relative cost, from a practical standpoint, per horse-power where these machines are used. It also finds the information absent where only one kind of a machine is used. This is particularly true of air appliances, presumably on account of the different conditions that would necessarily have to be considered, it being practically in its infancy, as it is only in the last four or five years that it has been recognized as an important factor in all well regulated shops.

Your committee is decidedly under the impression that both air and electricity are an advantage over steam for portable motors, and also there are conditions existing where the electric power is preferable for large perma-

machine where this work is to be performed to get the full benefit to be gained in expansion. The Committee has not been able to obtain any definite information, however, as to what per cent. of economy will be realized, or whether any practical device has been gotten up for portable motors now in use for this purpose, but believes a simple arrangement can be introduced on stationary motors with very satisfactory results.

For general railroad work, with the exception of special cases and conditions as enumerated, a well-designed air plant will be the most convenient and economical, all things considered.

A shop turning out 60 engines per year, with general repairs, has been equipped with an air plant consisting of one compressor, 15-in. steam, 14-in. air and 18 in. stroke cylinders, five ice-house elevators, one hoist for driving wheel lathe, six hoists for lathes and planers, two brotherhood engines, three motors, one pneumatic hammer, one plant for testing air brakes, one sand elevator, one fire kindler, one flue cleaner. The cost of above compressor, including foundations and pipe connections, was \$1,260.50. Pipe lines, hose, valves, reservoirs, motors, hoists, elevators and other appliances, \$1,189.50. Total, \$2,450. On a test run of eight hours, it required 313 lbs. coal per hour, or 2,508 lbs. for the eight hours' run. It required five minutes and forty seconds to raise pressure from 0 to 120 lbs. Compressor made 838 revolutions and compressed 2,681.6 ft. free air

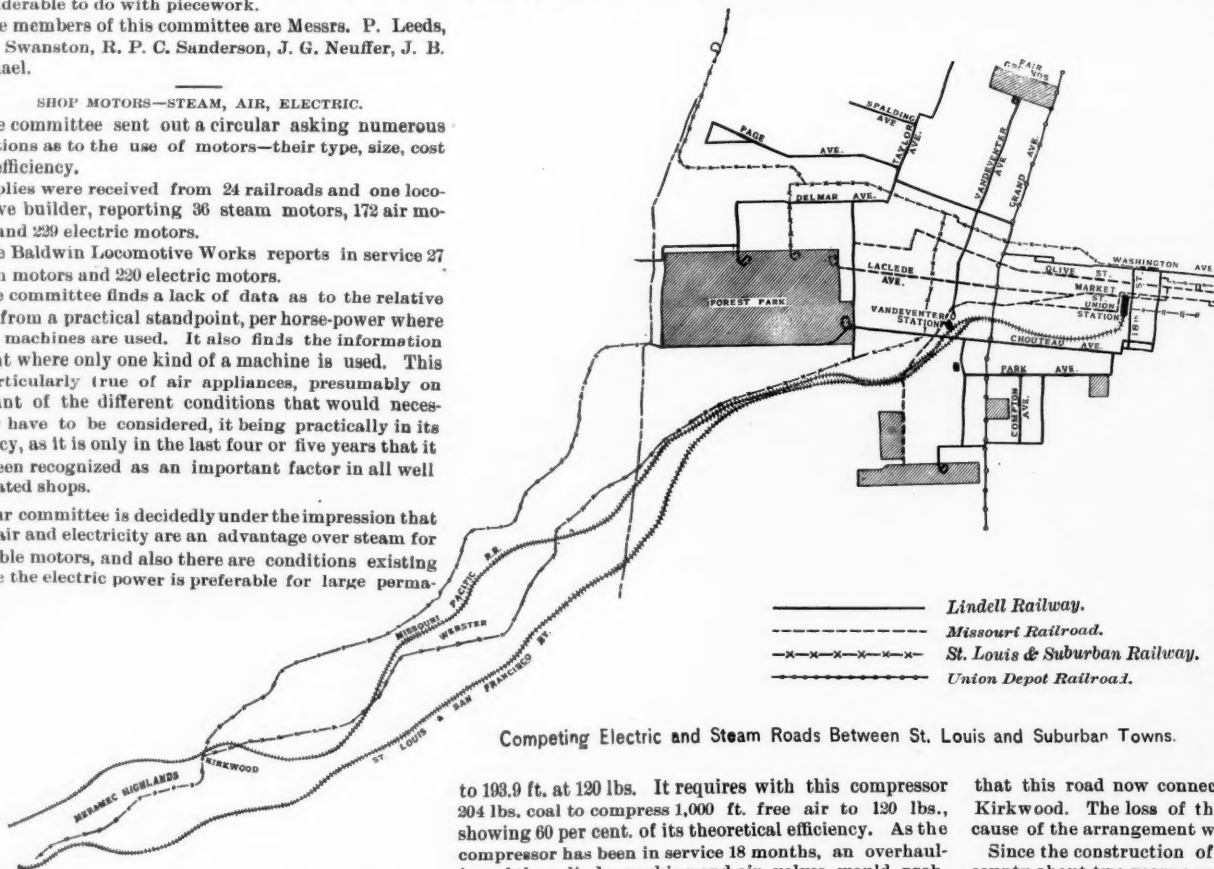
the business center. The trains stop at this point, and thereby keep out of crowded yards in the vicinity of the Union station. At Vandeventer station passengers transfer to the Chouteau Avenue Division of the Lindell Electric Railroad for downtown points, or to the Vandeventer Avenue Division for West End points. One free transfer will be given from either of these divisions to any other connecting division of the Lindell line.

The charter of St. Louis compels any street car line to permit any other line to run over parts of the other companies' line for a "reasonable compensation." This has been carried out repeatedly within the last few years after the usual legal battles. The street railroads are rapidly approaching consolidation or control by a very few strong companies. Ten years ago there were 18 companies; now there are six, practically four large systems and two single lines; one of the former and both of the latter will probably disappear within a few months.

There are about 15 stops on the steam road, and it is intended to make the run in 25 minutes; the run into the business part of the city from Vandeventer Station by electric road will be made in the same length of time. The fare is to be five cents within the city limits, and 10 cents from city to country. The time by the steam and electric roads from Meramec Highlands to the downtown city terminus is 50 minutes; the time by the electric roads alone is 1 hour and 45 minutes, and the round trip ticket between Kirkwood, Woodlawn, Oakland and

Glendale and St. Louis, including the street car coupon, is 25 cents, and to Webster and the other points but 20 cents, thus giving the combined roads so great an advantage that they will probably secure nearly all of the through business and a considerable part of the local.

The resident population at Kirkwood, Webster Grove, and other suburban places is about 50,000. Meramec Highlands is a beautifully situated summer resort with large hotel, picnic grounds, boating, etc. It commands a large pleasure travel business during the summer season, especially on Sundays and holidays. It is now supplied with one electric railroad connecting with the Chouteau Avenue Division of the Lindell road near the southwest corner of Forest Park. This line was very recently absorbed by the Suburban Electric Railway which now also controls the St. Louis & Meramec River Electric Railway which will soon be extended to Meramec Highlands. By referring to the map it will be seen



Competing Electric and Steam Roads Between St. Louis and Suburban Towns.

to 103.9 ft. at 120 lbs. It requires with this compressor 204 lbs. coal to compress 1,000 ft. free air to 120 lbs., showing 60 per cent. of its theoretical efficiency. As the compressor has been in service 18 months, an overhauling of the cylinder packing and air valves would probably produce a higher efficiency.

Compressed air is one of our most useful and most abused agents. It is used in our shops and yards in a very extravagant and wasteful manner. Small leaks are allowed to exist, valves allowed to blow a little, hose couplings leaking, motors from wear consuming an excessive supply of air, each in themselves a small item, but in a large plant collectively amount to a large waste causing increased service from the compressor and increased consumption of coal. When we treat our air plant in the same manner as a steam or an electric plant, in regard to stopping the small leaks, we will reduce the cost of compressed air and add to its efficiency.

The members of this committee are Messrs. J. H. McConnell, John Player, W. C. Arp, Wm. Renshaw, V. B. Lang.

Steam and Electric Roads Combined for Suburban Traffic.

Arrangements have been perfected whereby the passengers between St. Louis and the towns along the Missouri Pacific as far as Meramec Highlands, a distance of about 15 miles from Union Station, can have much better service and at a lower cost than formerly. The accompanying map will give an idea of the competing steam and electric lines between St. Louis and the suburbs, southeast of the city. The new schedule went into effect May 31, so that it is now too early to speak of the success of the arrangement.

Instead of fighting each other, the steam and electric railroads have combined, each to do that service for which it is best adapted; steam in the country, electricity in the city. The agreement is between the Missouri Pacific and the Lindell Electric railroads, the latter being one of the most important electric roads in St. Louis, controlling over 60 miles of track. The arrangement as perfected provides for running frequent short steam trains from Meramec Highlands to Vandeventer station, 3 miles within the city limits, and 3¼ miles from

that this road now connects Vandeventer station with Kirkwood. The loss of this connection is the probable cause of the arrangement with the steam road.

Since the construction of the electric lines into the county about two years ago, the Missouri Pacific as well as the St. Louis & San Francisco have been compelled to abandon over half of their suburban trains owing to a decrease of passenger traffic, and now run a few local trains only, mostly in the morning and evening. The new arrangement will give the steam road an opportunity to recover part of its former suburban business.

The Schoen Steel Hopper Cars at the Conventions.

A very fine exhibit was made by the Schoen Pressed Steel Co. at the the conventions. This consisted of three steel hopper cars. One car, which was built for the Carnegie Steel Company, was illustrated in the *Railroad Gazette* (June 12, 1896), and shown at the M. C. B. Convention of that year, at Saratoga; the other two cars were built recently for the Pittsburgh, Bessemer & Lake Erie.

The three cars were placed in one group at Old Point Comfort, so that differences in the construction were apparent. The principal difference between the two styles of metal cars is that in the car built last year the underframe is made up, of rolled shapes while in the new cars flanged steel has been used to the smallest details. The weight of the first car is 39,950 lbs. and Fox pressed steel trucks are used.

The substitution of flanged steel shapes makes possible the use of side and center sills in which the depth is reduced from the center toward the ends of the car to correspond to the difference in the bending moments at the various points. In the former car, rolled shapes being used, the sills had to be made the same depth at the ends as at the center. On account of this and other changes in the design the weights of the new cars are for one 34,100 lbs. and for the other 34,200 lbs., or a reduction in the dead weight of about 5,800 lbs. each. When it is considered what this weight, figured on a ton-mile basis, would amount to during the life of the car, it will be seen that an important improvement has been made and

nent motors via line shaft, for driving large tools, and where a convenient operation of an overhead crane is desired. Leaving the latter out of the question, however, where a line shaft can be conveniently operated with a well designed stationary plant your committee is under the impression the latter is the more economical.

For small portable tools the air motors are no doubt more convenient, if not as economical. As the committee is unable to gather any definite information based upon practical results that would assist us to establish that fact, but considering the danger of electricity which exists to some extent at least, and then considering the convenience of air in and around the shop, and the fact that any ordinary mechanic can repair, look after and handle air motors, the relative difference would have to be considerable to make the former preferable; however, the power-transmitting capabilities of each in combination with their other individual and peculiar lines of usefulness opens for them a distinct and separate field in which neither can be substituted for the other; therefore, it is well to anticipate the possible requirements for other than the transmission of power before coming to a final conclusion.

It seems to be certain that power may be transmitted by compressed air for a considerable distance with less loss than by any other known means. This is not figuring from the moment compression ceases, as there is an inevitable cooling of the air at that time with its necessary loss, but this figure to be taken after it has assumed its normal temperature, when its loss from any considerable distance is practically nothing.

The capacity of storage reservoirs is also an important item. They should be of such capacity as, under normal conditions of consumption, would enable the air compressor after the first charging, which, in a big plant, can be done before working hours in the morning, if necessary, to keep up the required pressure by being run at a moderate speed.

Much is gained by the reheating of compressed air, but it should be done immediately before entering the

that the additional first cost of the flanged steel construction will soon be saved by the reduction in the operating expenses. We are not at all sure that the use of pressed steel in the smaller members has not been carried too far for economy of construction and repairs and for strength at some points. This, however, is a matter to be determined only by a more careful analysis than we have made.

The new cars are equipped with Schoen metal, 100,000 lbs. capacity trucks. The axles have standard M. C. B. 5-in. x 9-in. journals, while the wheels are cast iron, furnished by the New York Car Wheel Works, of Buffalo. The wheels are known as the "T. M. Special Machined" grade and weigh 650 lbs. each. A 1-in. test bar of the material used broke under a load of 3,800 lbs. applied at the center, the supports being placed 12 in. apart.

The new cars are supplied with Westinghouse friction buffers and automatic air-brakes, and the brake cylinders are placed under the hopper at the end of the car. The Baker Forge Co., Elwood City, Pa., furnished all the forgings used on these cars.

In another issue will be given the detail drawings of the new cars and trucks, and we will only add now that they are grand specimens of the art of steel-car building so far as it has developed.

The Richmond Compound at the Conventions.

The Richmond Locomotive Works had a taking exhibit at the Old Point conventions, being the cylinders of the famous "tramp compound," No. 2427. These were taken out September, 1896, in order to put in larger cylinders. The old cylinders were 19 in. and 30 in. x 24 in. They were replaced by cylinders 20 in. x 32 in. x 36.

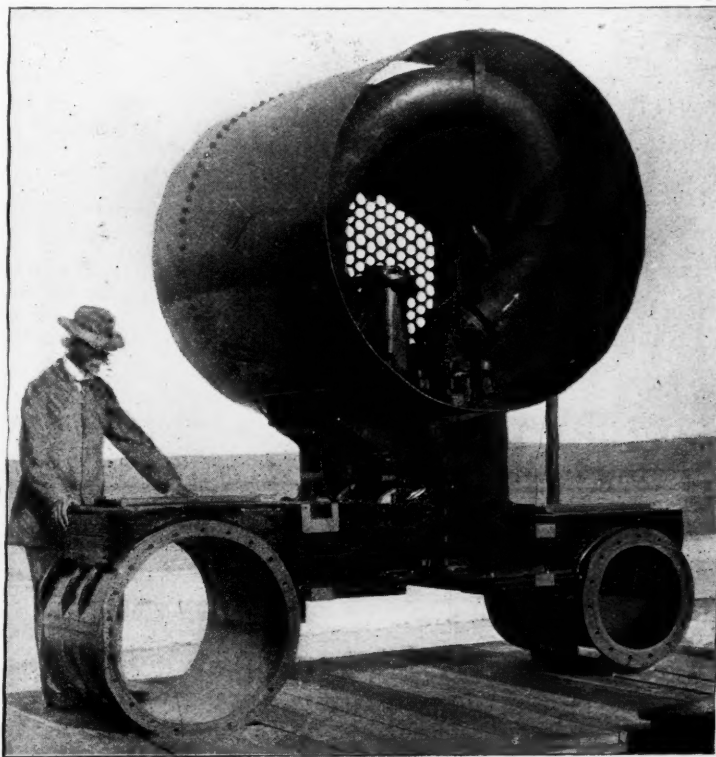


Fig. 1.

Cylinders of Richmond "Tramp Compound" No. 2427.

As Shown at Old Point Comfort.

The old, low-pressure cylinder was re-bored to show the quality of the casting and the saddle casting cut away to show the intercepting valve, and to the whole was attached a section of a front end showing the receiver.

Fig. 1 gives a general view and Fig. 2 a detail of the intercepting valve. The position of the intercepting valve is that when the engine is working simple, with a maximum pressure in the low-pressure cylinder. It shows the intercepting valve closed to the receiver, the reducing valve (sleeve) closed at this instant against the live steam supply and the open communication from the receiver to the atmosphere through the emergency valve at the left of the cut.

The career of this "tramp compound" was followed in the columns of the *Railroad Gazette*, and probably the reader remembers it pretty well. It was built in September, 1894, and designed as a fast freight engine, being a 10-wheeler, but it has been run in every class of service from switching and slow heavy pulling to fast, passenger express runs. It began on the Mountain Division of the Chesapeake & Ohio, then it ran on the Big Four, on the Pennsylvania, on the Pittsburgh, Fort Wayne & Chicago, on the Rock Island, the Chicago & Northwestern, the Chicago, Milwaukee & St. Paul, the Chicago & Grand Trunk, the Illinois Central, and the Louisville & Nashville and probably still other roads.

A circular issued by the locomotive works gives particulars of the experience on seven railroads where No. 2427 was thoroughly tested with an average saving of 26.1 per cent. of coal. The same pamphlet contains something of the records of a number of other Richmond compounds.

National Local Freight Agents' Association.

The tenth annual meeting of the National Association of Local Freight Agents' Associations was held at Washington, D. C., June 8 and 9, Mr. F. P. Eyman (C. & N. W., Milwaukee) in the chair, and W. J. Jackson (C. & E. I., Chicago) at the Secretary's desk. Twenty-nine local associations were represented by 150 delegates. A Credential Committee was appointed and an adjournment taken until evening, to give opportunity for fraternal greetings among members and their wives. President McKinley received the party at 2:30, after which sight seeing was indulged in until dinner time. At the night session the reports of officers and standing committees were submitted, showing the association to be in a most flourishing condition as to numbers, interest and finance.

The Special Committee appointed at New York in 1895 to secure agents in transportation charges for government bonded freight, reported having brought the matter to a favorable conclusion by securing an act of Congress making the revenue officer taking charge of the freight responsible to the transportation companies for their charges. The association voted to thank the committee, of which Mr. J. L. Korn (B. & O. S. W., Cincinnati) was Chairman.

The Special Committee, appointed in 1896 to draft and submit to the Railway Accounting Officers' Association a form of freight bill (expense bill), reported having done so, and that their recommendation had been adopted by that body at its meeting this year.

The association then amended the constitution and by-laws. The principal change is in the qualifications for membership, which now read: "Local associations in cities having five or more railroads or having three or more railroads and a population of not less than 50,000 inhabitants."

The first topical discussion was presented by M. Townsend, of the Pennsylvania (New York Association), and called forth great interest, the speaker graphically describing the restrictions

regulations for assessing and collecting terminal switching revenue.

Upon the suggestion by an able paper from Peoria, uniformity in fast freight line guide-books was recommended to the railroad traffic officials.

"Order Shipments" came in for a large amount of discussion. Pittsburgh desired that all agents be impressed with the importance of showing on card way bill and the revenue way bill the last car number and the original car number, through to destination on all "order" shipments. St. Louis desired to so modify the rules as to discourage such consignments by imposing higher rates, and Wheeling would have printed rules distributed among employees and shippers; also would urge a better system of bank exchange, and, above all, absolutely adhere to the rules as the best remedy for the abuses that have crept into the use of the "order" bills of lading.

It was found by discussion that in large stations it is advantageous to employ expert rate clerks in classifying, rating and extending shipping orders before passing them to bill clerks to enter on way bills. At smaller stations the plan is obviously less practicable.

The business of the convention closed by the election of A. D. Smith (West Shore, New York City), President; C. E. Fish, Jr. (C. & H. & D., Cincinnati), Vice-President; M. Townsend (Pennsylvania, New York City), Secretary; C. H. Newton (Wabash, Fort Wayne), Treasurer. Cincinnati was chosen as the next place of meeting, and the time June 14, 1898.

A trip to Mount Vernon by the delegates and their families, as guests of the Pennsylvania Railroad, was made on Thursday, and Friday they were the guests of the Baltimore & Ohio, inspecting the extensive terminals of all lines in the city of Baltimore.

UNNECESSARY RESTRICTIONS IN THE TRANSPORTATION OF BONDED FREIGHT.

Mr. Townsend began with a historical sketch of the establishment of customs duties in the United States. Ports of delivery were first established at inland cities in 1831. In 1854 the Warehouse and Transportation Act was passed, facilitating prompt transfer from vessels to inland carriers, the consignee being required to give a bond guaranteeing the payment of all duties. In 1870 the Immediate Transportation Act was passed, by which unappraised merchandise could be shipped from the sea

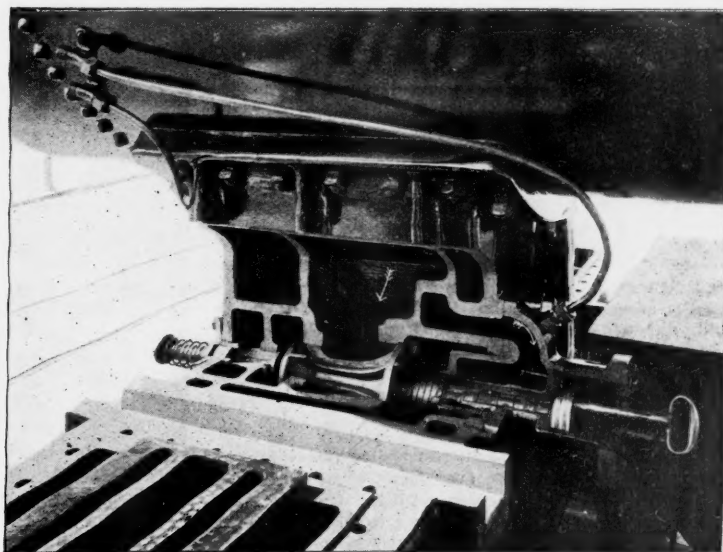


Fig. 2.

placed upon immediate transportation in bond of consignments for inland cities, and suggesting a remedy. (See abstract of paper below).

The discussion revealed that consignors of such freight as well as owners of free freight, transported in same cars, suffered great delay, annoyance, and in many instances loss by reason of the embargo. A committee was appointed, with Mr. Townsend as Chairman, to take the matter up and endeavor to have the evil remedied by the government.

Buffalo suggested that cotton bales be marked with tin tags, special marks being stamped thereon, instead of being marked with a brush, which was endorsed by the association.

Chicago's topic, "Piece work at Freight Stations," elicited a three hours' discussion and brought out a great divergence of views. Agents who have tried paying by piece work were for the most part favorable to the plan, and those who most strongly opposed were agents who had not tried it. Mr. J. V. Braden, Agent of the Pennsylvania Lines at Wheeling, W. Va., who read a paper, held that paying for freight-house labor by tonnage, as in use at his station, was satisfactory to both employer and employee. He is now testing a plan of paying the clerical force by piece, and this promises satisfactory results; but the association as a body resolved that paying by the piece at freight stations was not practicable.

Cincinnati proposed a special form of bill of lading for use in making shipments "to order," which was referred to a committee for further investigation and report, as was Kansas City's proposition to get uniform

board to interior cities in bond. The government, however, still required a personal bond from the consignee, and it was not until 1880 that the present law was passed, allowing the shipment of imported merchandise under a bond given by the carrier. Practice under this law, which has now continued for 17 years, has developed the need of further removal of restrictions. The amount of bonded freight carried by the railroads is now very large but the restrictions are still carried out in all their detail. The government requires checks and counter checks, and the inspection of goods and sealing of cars by a customs officer. Freight must be loaded through without transfer, so that if there is not a carload for a certain city—St. Paul, for instance—the railroad may deem it necessary to refuse the freight until a future day. Sometimes it can fill out a car with freight not bonded, but in this case the consignees of the free freight may suffer unwarrantable delay and make a complaint. The car cannot be unlocked at destination until the government official is on hand. The consignees of the bonded freight may also suffer inconvenience in consequence of the presence of the other freight in the car. Thus all consignees at interior cities should be interested in a modification of the law.

Mr. Townsend then went on to describe the procedure with typical shipments. Cars must be loaded before sundown, and the prohibition of loading at night may produce unreasonable delays. The speaker held that the absurdity of the restrictions on the railroads was shown by the looseness of the regulations for teamsters. Goods transferred from the wharf to the railroad by wagon may be carted all over New York City, without protection and without government seal. The teamster is bonded, of course, but he simply carries a memorandum ticket and gets a receipt that the goods are delivered to the railroad in apparent good order. But the railroad must put the goods in a particular warehouse; must have the customs officer inspect the car; must use registering locks or seals; put special cards on the cars, and repeat all the red tape at the other end of the route.

Mr. Townsend holds that the ordinary protection of

shipments of ordinary freight by the railroad is sufficient for bonded goods, and advocates an amendment of the law permitting shipment of goods, under suitable regulations, without the present extreme restrictions. The railroads are certainly as fully responsible as the draymen. To have a customs officer to attend the loading and the discharge of all bonded freight is an unnecessary expense and an annoyance to all concerned. It is recommended that the bonded manifest and the special bonded locks be used as at present, but freight could be transferred at junctions, where necessary. The organization of the freight transportation department of railroads is now sufficiently perfect to justify the desired change. Moreover, appraised merchandise in bond, if corded and sealed, is already allowed to be carried the same as ordinary merchandise. This has been done for nearly a year, and the removal of the former restrictions has done no harm; therefore why not remove them from unappraised goods also? The object of the Congressional law is to promote the facility with which import commerce can be carried on, and the proposed changes would tend to further this object.

The Revenue Side of Car Service.*

BY A. L. GARDNER, BALTIMORE, MD.

By revenue is meant not the imaginary thousands of dollars saved by the additional use of cars and by the reduced cost of switching, which were boasted of in the early days of demurrage associations, but the actual earnings of cars used for store-houses, as shown by the records of to-day. Upon the proper collection, accounting and retaining of car service revenue depends to a large extent the efficiency of the car service association; yet railroad managers still fail to realize that this money is really earned and ought to be kept. Moreover, many roads do not know how much car service is earned; they require agents simply to account for what money is collected. Uncollected bills are allowed to run, and unless the manager keeps careful watch consignees are let off without paying. Claims for aggravated delay in transit and for loss and damage will be fought, tooth and nail, but the minute a tariff manager notices a car service charge in the bill of particulars he becomes exceedingly generous and promptly recommends the payment of the claim. Charges for switching, or handling, or warehousing will be protected and held on to, but the poor defenseless car service dollar is given up with great openheartedness.

The fact is that notwithstanding eight or nine years' experience, car service (demurrage) is still an unknown quantity. Where is the railroad that has revised and perfected its instructions to agents? Information is not adequately diffused, hence it is no mystery that the education of the public has not been consistently carried out. Traffic officers still recommend the refunding of demurrage money, simply because the claimant is a good friend of the line. It is sometimes asserted that shippers out West must be tenderly dealt with because they do not know about car service associations. This is a fallacious claim, for those shippers do understand the situation as well as others; but they should send their claims direct to the car-service manager. Mr. Gardner received a claim from the West which had been 65 days on the road, having been presented through the traffic department. If it had come direct, it would have been settled in 10 days.

The speaker summed up his suggestions in a recommendation that agents be held responsible for all car service earned, daily reports of earnings, as they accrue, being required; that money once turned over to the treasury be not given up for any less weighty reason than would be required in the case of any other revenue for which value had been rendered; where freight is sold for charges, the car service bureau should have its share of the proceeds instead of all being credited to transportation, as is now generally the case.

Some roads realize the situation and now treat car service matters with great exactness; and in some associations charges are required to be collected with the same regularity as transportation charges. Of course the success of this rule depends upon the spirit of the superintendent and the agent immediately responsible for its enforcement.

Rulings of the Georgia Railroad Commission on Demurrage.*

Mr. Joseph C. Haskell, Manager of the Southeastern Car Service Association at Atlanta, read a paper on the demurrage regulations issued by the State Railroad Commissioners of Georgia in February, 1896, describing the experience of the railroads in working under them. When demurrage was first charged in Georgia the Board of Trade of Macon complained to the Commissioners, alleging discrimination, other cities being exempt while at Macon "car service" was collected. The Commissioners then made regulations and required each road to enforce them at all stations or at none. The railroads protested against the regulations, claiming that the Commission had no authority over charges for storage of goods in freight cars and complaining also of some particulars of the Commissioners' regulations, such, for instance, as the requirement that notice must be given the consignee in each case of the free time extended; but they finally adopted the rules, under protest.

*Abstract of paper read at the annual meeting of the National Association of Car-Service Managers, Boston, June 16, 1897.

and Mr. Haskell says that the experience of the last year and a half has been satisfactory.

It has been a great benefit to have this official recognition of the necessity and propriety of car service. The principle has a better standing in Georgia than elsewhere. The prohibition of discrimination compelled the railroads to pursue a firm policy. When they saw that they must enforce collections everywhere or give them up at all points, they quickly decided to continue the regulations. Wherever demurrage is a hardship to the consignee, the responsibility, or a part of it, can be shifted to the shoulders of the Commission.

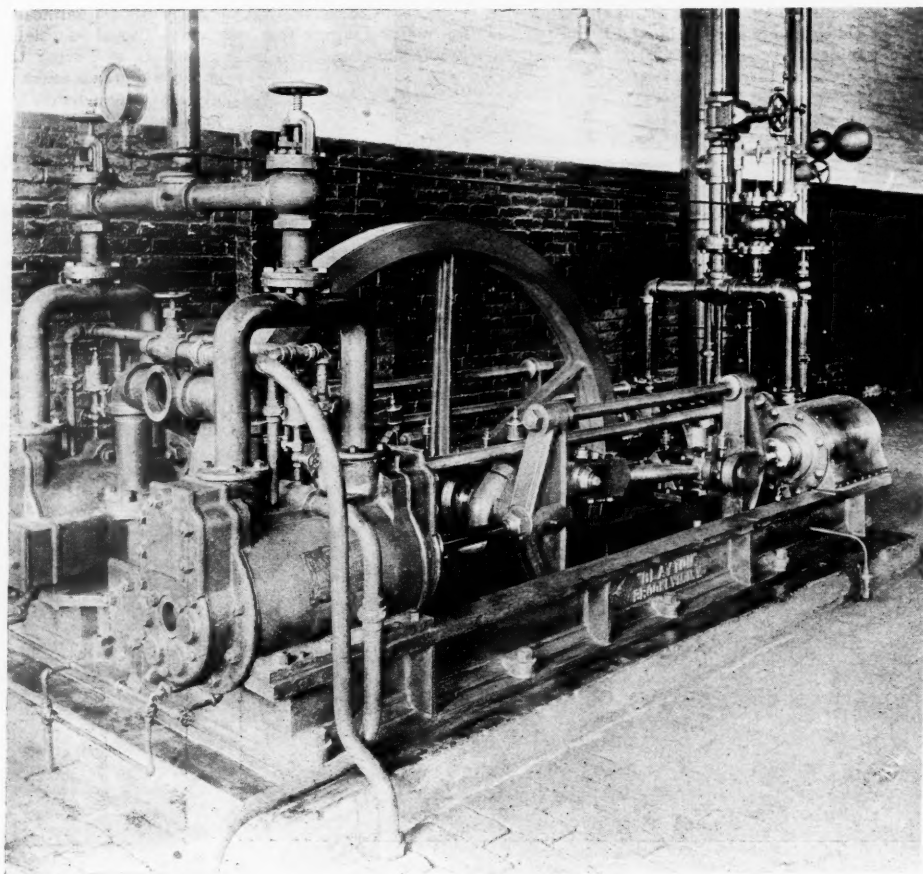
Mr. Haskell says that the successful working of the rules is attributable not to the excellence of the rules themselves, but to the moderation and good sense of the Commissioners. They have approved exceptions wherever the enforcement of the rules worked undue hardship on either the roads or the public, and they "have acted as a court of appeal, using a wise and broad discretion in their dealings, seeking to do justice to both the roads and the public. They have taken a liberal view of the circumstances of each case, recognizing that the rules are arbitrary and too stringent to work effectively if not so handled. Continuing, Mr. Haskell says:

"Had these rules been in the hands of men lacking the above-mentioned qualities, or inimical to the railroad corporations, they would have proved so obnoxious as to compel the railroad authorities to abandon their enforcement, or to seek, through the Courts, the redress which they believed, and still do believe, would have been found from that source. Fortunately for all parties,

The Clayton Duplex Air Compressor.

The accompanying illustration is reproduced from a photograph of a Clayton duplex air compressor of the latest improved pattern, installed in the Altoona shops of the Pennsylvania Railroad Company, for supplying compressed air for general shop uses. The compressor has steam cylinders, each 10-in. diameter x 13-in. stroke and air cylinders, each 10-in. diameter x 13-in. stroke. The capacity is 307 cu. ft. of free air per minute, working at 130 revolutions, and it works under 100 lbs. air pressure with 80 to 90 lbs. pressure of steam. It has suction and discharge valves of the poppet type screwed into the cylinder heads. A liberal valve area is provided at each end of the cylinders, which are double acting, thus insuring an intake of the full cylinder capacity in free air at each stroke. These valves are provided with guard bolts, flange nuts and jam nuts, which prevent the possibility of the valves becoming dislodged and falling into the air cylinders. In addition they have cushion and closing springs, which insure positive working at the proper time, with noiseless movement.

The pistons of the air cylinders have composition metal rings and can be kept tight without excessive friction. The air cylinders are surrounded with the Clayton patent water-circulating jackets, which permit the concentration of the water at the ends of the strokes where the heat of compression is greatest. The valves are readily accessible by removing the cylinder covers, which is a feature of merit in the design, avoiding long delays for repair or adjustment.



The Clayton Duplex Air Compressor—Altoona Shops Pennsylvania Railroad.

such a necessity has not arisen, owing to the spirit of conciliation exhibited by the Commission and by the railroads in dealing with one another."

The car service rules of the Georgia Railroad Commission are different from other rules in seven particulars:

1. Notice is always required. The notice must state the initial, number of car, contents, weight and amount of charges. Notice may be either actual or constructive. When actual notice is given the free time is 48 hours from 10 a. m. of the day following the day of notice. When notice is sent by mail 24 hours additional free time is allowed, and in that case, should consignee make affidavit that neither he nor any of his employees received such notice, no car service can be assessed until the fact of notice is established.
2. Cars must be held accessible for unloading during the entire free period, otherwise no charge can be made for their detention. After the free period has expired they may be removed by the railroads and put upon the "hold tracks" until ordered "placed" by consignee.
3. Thirty hours additional free time is allowed on all cars in excess of three (3) received by one consignee on any given date, regardless of whether cars are delivered at one point or at various points at the same terminal station.
4. Railroads must pay consignees \$1 per day for failure to place cars within 48 hours after arrival.
5. Railroads must pay shippers \$1 per day when they fail to forward cars within 24 hours after same have been loaded and shipping directions furnished.
6. Non-compliance with these rules, regardless of the circumstances, is held to be discrimination. Railroads must charge all persons liable under the rules under all circumstances, or not charge at all.
7. No charge can be assessed for time lost in unloading cars on account of bad weather. While it is not stated who is to be the judge as to the matter of fact, the consignee generally decides this point for himself, and if the railroad should feel aggrieved an appeal would have to be made to the Commission.

The compressor, being arranged with cranks at right angles, combines the merits of the duplex pattern, including the assistance which one side renders to the other when the greatest strain of compression takes place, insuring absolute evenness of motion and perfect distribution of strains. The compressor has the Clayton patent air governor, which is automatically regulated by the air pressure and which acts directly on the steam supply, governing the operation to suit the work being done and maintaining an unvaried air pressure. This governor stops and starts the compressor as the air pressure requires, the machine having no dead center.

The compressor shown also has the Clayton patent connecting-rod arrangement, with vertical cross-heads and adjustable slipper-guides, by means of which the cylinders are relieved of excessive piston wear. The frames are of substantial pattern and the crank shaft, bearings and other parts of the mechanism are of the heaviest type.

During a period of 25 years' experience, devoted entirely to the construction of air-compressing machinery, the Clayton works have been instrumental in the development of many of the applications of compressed air-power which have been recently brought to public notice. Naturally interested in seeing the field of usefulness for compressed-air machinery extended to its fullest limits, and realizing that the economical production of compressed air-power with the least percentage of loss, would be a most important factor in widening the field of application, the ripe experience of years and the most advanced knowledge of the times have been united in the single purpose of producing the highest obtainable economy and efficiency in an air-compressing machine.

Rodger, Hopper Ballast Cars.

The Grand Rapids & Indiana Railroad Company (part of the Pennsylvania system) has recently had built by the Rodger Ballast Car Company 75 standard Rodger ballast cars (hoppers) and two Rodger ballast distributing cars. These are of the class known as the combined ballast, coal and ore cars, and retain all the features of the original Rodger ballast cars, and at the same time are adapted to handling either ore or coal. They have a capacity of from 20 to 22 cu. yds. of ballast, either gravel or broken stone; a capacity of 30 tons of ore, and the same capacity for coal. They are built under the general Master Car Builders' standards for 60,000 cars, but in some of their details they follow the special standards of the Pennsylvania Railroad. The trucks are of the 60,000 lbs. class, but the bodies of the cars carrying the hoppers have a capacity of 100,000 lbs.

The trucks are of the standard Rodger ballast car type, diamond frames, having the top arch bars 1½ in. × 4 in., bottom arch bars 1½ in. × 4 in., with tie bars ¾ in. × 4 in. The axles are of steel, rough turned, having 4¼-in. × 8-in. journals, 5½-in. wheel seats, and are of the dimensions and quality of steel required in the Pennsylvania Railroad's specifications of Aug. 25, 1896. The wheels are cast-iron, 33 in. diameter, of the Wells & French Company's manufacture, and are cast to stand the heat test and the physical tests required in the Pennsylvania Railroad specifications of Jan. 5, 1897.

The bolster springs are helical, of the Pennsylvania Class "W" for freight cars and of the Scott Company's make. Journal bearings are of phosphor bronze, of Pennsylvania Railroad make. The drawbar attachments are the Graham draft rigging and were made by the Pennsylvania Railroad, having helical springs to meet the Pennsylvania Railroad specifications for this class of springs.

The bodies are the standard Rodger ballast car body, with longitudinal hoppers, supported by bridged sides and having longitudinal bottom doors, opening 14½ in. wide by 18 ft. long, having side sills 6 in. × 14 in., and intermediate sills 8 in. × 10 in., all of Southern yellow pine, with end sills of oak 10 in. × 10 in., and having Southern yellow pine hopper flooring 1½ in. × 6 in. ship-lapped. The capacity of the hoppers is 423 cu. ft., when level full, and when heaped they carry 20 to 22 cu. yds. of ballast. The hoppers are supported by four-body truss rods 1½ in. round, with ends enlarged to 1¾ in.

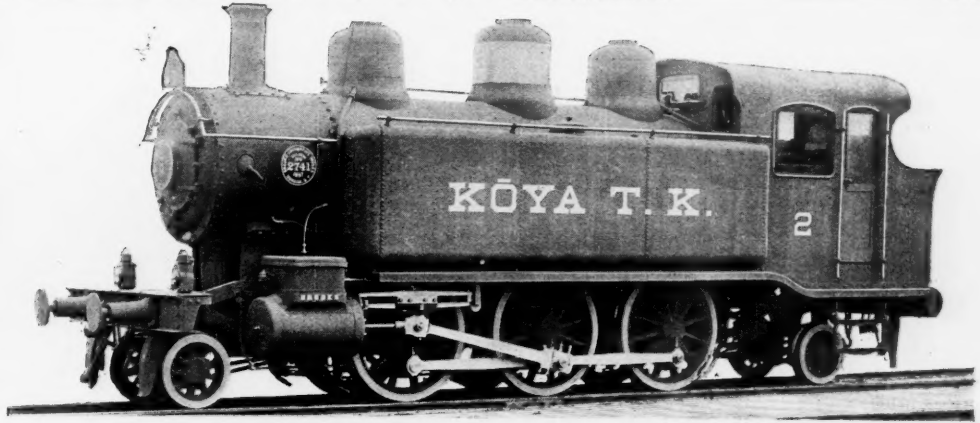
The center plates are of malleable iron to fit 10-in. transoms. The hopper door shafts are 1¾ diameter the entire length, worked by malleable iron levers and fitted with double ratchet wheels and pawls. The door chains are fitted with ¾-in. turnbuckles for adjustment, and are positioned by malleable winding guides. All cars except the distributing car (which is only piped for air) are fitted with Westinghouse automatic brakes of schedule H-1, W. A. Brake Company's catalogue, with brake leverage figured at 80 per cent. of the weight of car. Janney automatic couplers are used, with latest pin lifter attachments, after the Pennsylvania Railroad specifications.

The plans and specifications for these cars were made

wheel base 10 ft. 4 in. and a total weight in working order of 92,000 lbs., of which 70,000 is carried on the driving wheels and 11,000 lbs. on each of the truck wheels. The boiler is of the straight-barrel type and carries a working steam pressure of 150 lbs. per square inch. There are 872 sq. ft. of heating surface in the tubes and 78.1 sq. ft. in the firebox, making a total heating surface of 950.1 sq. ft.; the grate area is 14.8 sq. ft. The boiler and firebox are of Otis steel, and the tubes are seamless drawn brass.

The two side tanks have together a capacity of 1,300

Dome, diameter.....	28 in
Firebox, length.....	6 ft. 3 in
" width.....	2 ft. 5½ in
" depth front.....	56 in
" back.....	45 in
" Material Otis firebox steel	
" thickness of sheets.....	¾, ¾ and ½ in
" brick arch.....	On stud
" water space. Width; front, 3¼ in.; sides, 3 in.; back	3 in
Grate.....	Kind of cast-iron rocking
Tubes, number.....	216
" Material seamless drawn brass	
" outside diameter.....	1¾ in
" length over sheets.....	9 ft. 6 in
Smokebox, diameter.....	54 in



A Brooks Tank Locomotive for Japan.

imperial gallons of water, and there is space in the tender, carried on an extension of the engine frame, for two tons of bituminous coal.

The tires for the driving and truck wheels were furnished by the Midvale Steel Co.; the lubricators by the Nathan Manufacturing Co.; injectors by William Sellers & Co.; driving and truck springs by the A. French Spring Co.; valve rod and piston rod packing by C. C. Jerome; headlights and lamps by the Star Headlight Co. The boiler is covered with asbestos board lagging, and the steam and hand brakes are designed and built by the Brooks Locomotive Works.

The following gives the principal dimensions of these engines:

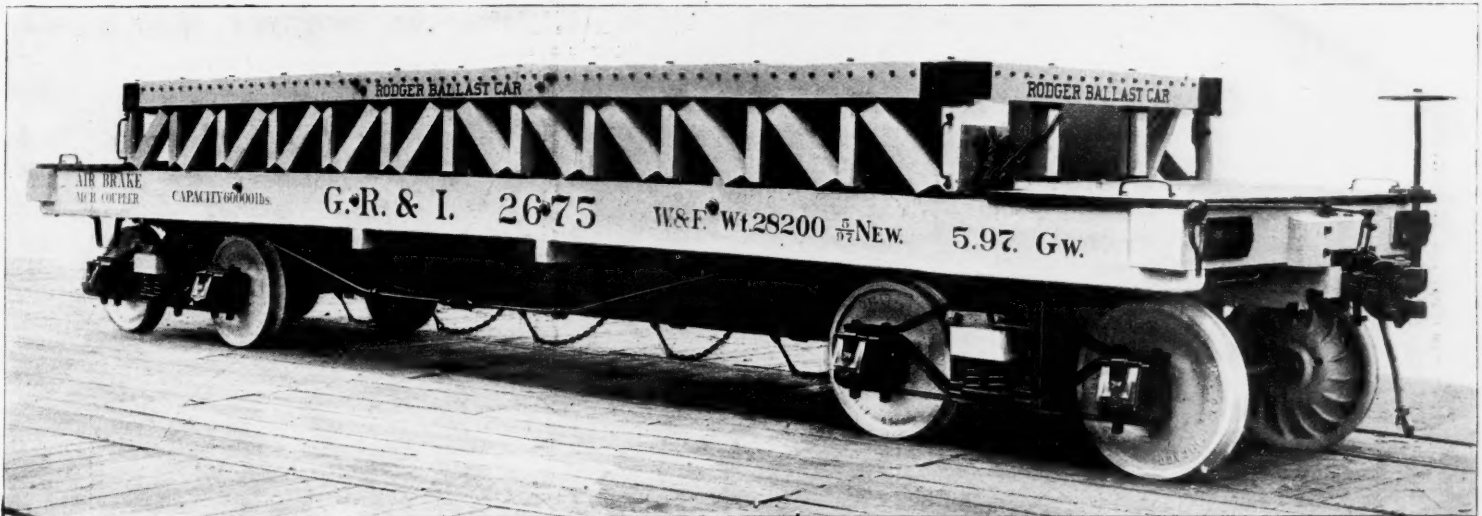
Fuel.....	Bituminous coal
Weight on drivers.....	70,000 lbs.
" truck wheels.....	F. and B., each 11,000 lbs.
" total.....	92,000 lbs.
Wheel base, total.....	21 ft. 4 in.
" driving.....	10 ft. 4 in.
Length over all.....	40 ft. 0 in.
Height, center of boiler above rail.....	6 ft. 11 in.
" of stack above rail.....	11 ft. 10 in.
Heating surface, firebox.....	78.1 sq. ft.
" tubes.....	872
" total.....	950.1
Grate area.....	14.8
Drivers, diameter.....	50 in
Drivers, material of centers.....	Cast iron
Truck wheels, diameter.....	36 in.
Journals, driving axle, size.....	6½ × 8 in.
" truck.....	4½ × 7 in.
Main crank pin, size.....	4¼ × 4¼ in.

Smokebox, length.....	52 in.
Exhaust nozzle.....	Double permanent
" diameter.....	4 in.
" distance of tip above center of boiler.....	3½ in.
Netting.....	Wire
" size of mesh or perforation.....	2½ × 2½ in.
Stack.....	Straight
" least diameter.....	12 in.
" greatest diameter.....	12 in.
" height above smokebox.....	2 ft. 7 in.
Tank capacity for water.....	1,300 Imperial gallons
Coal capacity.....	About 2 tons
Thickness of tank sheets.....	¾ and No. 7.
Length of tank.....	15 ft. 6 in.
Width of tank.....	1 ft. 9 in.
Height of tank, not including collar.....	4 ft.

A Visit to the Richmond Locomotive Works.

A party of about 400 persons made up of members of the M. C. B. and the M. M. associations and their friends were entertained, Saturday, June 12, by the Chesapeake & Ohio and the Richmond Locomotive Works. An inspection trip being made to the Richmond Locomotive Works. A special train consisting of a C. & O. compound locomotive, recently built by the Richmond Locomotive Works, and 11 coaches left Old Point Comfort at 9:10 a. m. A stop of 50 minutes was made at Williamsburgh to allow the party to visit the many points of historic interest at that place.

On arrival at the Locomotive Works, the officers of that company took the party in charge and lunch was



Rodger Ballast Car—Grand Rapids & Indiana Railroad.

under the supervision of Mr. J. E. Keegan, Master Mechanic of the Grand Rapids & Indiana, and the cars are to have all the latest improvements of the Rodger Ballast Car Company. They were built at the shops of the Wells & French Company at Chicago, and are now being used on the Northern Division of the Grand Rapids & Indiana.

Tank Locomotive for the Koya Railroad of Japan.

The Brooks Locomotive Works has recently built and shipped to the Koya Railroad of Japan four side-tank locomotives having six coupled driving wheels and leading and trailing trucks. These are for use on a road built to a gage of 3 ft. 6 in. and are especially intended to run in either direction without turning the engine.

These locomotives have cylinders 15 in. in diameter by 22 in. stroke, driving wheels 50 in. in diameter, driving

Cylinders, diameter.....	15 in.
Piston, stroke.....	22 in.
" rod, diameter.....	2¾ in.
Kind of piston rod packing.....	Jerome
Main rod, length center to center.....	5 ft. 6 in.
Steam ports, length.....	14 in.
" width.....	1½ in.
Exhaust ports, length.....	2½ in.
" width.....	1½ in.
Bridge, width.....	15½ in.
Valves.....	Richardson balanced
" Greatest travel, 6¼ in.	
" Outside lap, ¾ in.	
" Inside lap or clearance, ¾ in.	
" Lead in full gear, ¾ in.	
" Lead constant	
Boiler.....	Straight top
" Working steam pressure, 150 lbs.	
" Material in barrel, Otis boiler steel	
" Thickness of material in barrel, ¾ and ½ in.	
" Diameter of barrel, 51 in.	
Seams.....	Horizontal, double welded quadruple riveted
" Circumferential, double riveted	
Thickness of tube sheets.....	1½ in.
" crown sheet.....	¾ in.
Crown sheet.....	Stayed with radial stays

served in the new building which has just been completed and will in the future be occupied by the blacksmith shop. Speeches were made by Messrs. R. H. Soule and A. M. Waitt for the associations, by Mr. W. R. Trigg for the Richmond Locomotive Works and by Mr. W. S. Morris for the Chesapeake & Ohio Railway.

After going through the locomotive works, carriages were taken and the principal points of interest in and about Richmond were visited. The special train on the return left Richmond at 5:40 and arrived at Old Point Comfort at 7:10.

The Richmond Locomotive Works has a capacity for building 150 engines per year, and when working to the full capacity employs about 900 men. Quite recently many improvements have been made which consisted in replacing the old-style tools by modern improved machinery suitable for building heavy locomotives.

As mentioned before, a new shop has just been com-

pleted which will contain the large hammers and tools used in heavy forging. The shop now being used for a blacksmith shop will be fitted up as a carpenter and pattern shop. This company now has a number of engines building in the shops, as shown by the following list: Southern Railway, 10 consolidation engines; 21-in. x 28-in. cylinders; total weight, 150,000 lbs.; boiler pressure, 200 lbs. per square inch; driving wheels 58 in. Also two 10-wheel passenger engines; 21-in. x 28-in. cylinders; total weight, 150,000 lbs.; boiler pressure, 200 lbs. per square inch; driving wheels, 72 in. Chesapeake & Ohio, six consolidation engines; 21-in. and 32-in. x 24-in. cylinders; total weight, 143,000 lbs.; boiler pressure, 200 lbs. per square inch; driving wheel 50 in. Also four six-wheel switchers; 18-in. x 24-in. cylinders total weight, 102,000 lbs.; driving wheels 50 in. New Orleans & Northwestern, one 8-wheel passenger engine; 18-in. x 24-in. cylinders, total weight, 105,000 lbs.; boiler pressure, 160 lbs. per square inch; driving wheels, 66 in. Aberdeen & West End—One 8-wheel passenger engine; 14-in. x 20-in. cylinder.

The works are also converting a class "H" mogul engine, belonging to the Chicago, Burlington & Quincy, into a two-cylinder compound, with cylinders 21½-in. and 33½-in. x 24-in. This engine which is being changed was a compound locomotive with the Lindner system of starting gear. There have just been completed for the Charleston & West Carolina Ry. nine 10-wheel freight engines; 18-in.

x 24-in. cylinders; total weight, 114,000 lbs.; boiler pressure, 180 lbs. per square inch; driving wheels, 56 in. Also for the same road, one 6-wheel switcher, 18-in. x 24-in. cylinders; total weight, 102,000 lbs.; boiler pressure, 160 lbs. per square inch; driving wheels, 50 in.

Manchester Passenger Station.

The Boston & Maine Railroad has just begun work on the erection of a handsome new passenger station at Manchester, N. H., which is shown in plan and elevation in the accompanying drawings. The building is to be 228 ft. long and from 44 to 70 ft. wide. In those portions which are more than one story in height the rooms in the second floor are utilized for offices. The tower is 85 ft. high. The exterior of this building is light buff brick with a brownstone base. The trimmings are also of brownstone. The roofs, both of the station proper and of the adjacent awnings over the platforms, are to be covered with red slate.

The principal rooms shown in the plan have marble tile floors, while the smaller apartments, the ticket office, agent's office, dining-rooms and women's toilet-rooms have maple floors. The baggage and express rooms have hard pine floors, and the finish is of the

This station is being built under the direction of Mr. H. Bissell, Chief Engineer of the road, who informs us that the plans were made in his office by Mr. Fletcher. The contractors are the Head & Dowst Company. It is expected that they will finish the building by Dec. 1.

The M. C. B. Convention.

The thirty-first annual convention of the Master Car Builders' Association was called to order Tuesday morning, June 8, at 10 o'clock, in the usual manner, the minutes of the previous meeting being adopted as printed in the advance reports. Col. Royal T. Frank, Commanding Officer at Fort Monroe, and Gov. Charles T. O'Ferrall,



Fig. 2.—Manchester Passenger Station—End Elevation, Looking South.

of Virginia, made addresses of welcome, to which Mr. J. N. Barr responded for the association.

Mr. S. A. Crone, President of the association, made an address, calling attention to a number of important subjects which should receive attention. He spoke of the advantages which had followed the adoption of the rules which became operative September 1, 1896. They have increased car mileage, produced more rapid movement of freight, greatly improved the condition of rolling stock and brought about a large saving in repairs. He recommended a further trial with some slight modifications, suggesting, however, that an unnecessary number of repair cards is applied and that a minimum amount should be fixed for which cards should be used, and no card required for wheel, axle, brass and brakeshoe changes.

He spoke again of the burdensome number of cases submitted to the Arbitration Committee and recommended that the Secretary of the association be empowered to render an official opinion as to the intent or interpretation of the rules, and that in cases of dispute, when the services of the Arbitration Committee are required, each party to the dispute should pay in a fee of \$10, the fee of the party winning to be returned.

He recommended that the association adopt a stand-

The Secretary reported a total membership of 440; that is, 256 active members, 179 representative members and 5 associate members. The number of cars represented is 1,222,482.

The following committees were appointed:

Nominating Committee, Messrs. J. S. Lentz, W. S. Morris, W. P. Appleyard, W. H. Harrison and B. Welch, Committee on Resolutions, Messrs. E. W. Grieves, Robert Miller and J. W. Marden.

Auditing Committee, Messrs. Wm. Garstang, L. B. Paxson, W. H. Lewis.

Abstracts of most of the reports of committees were given in our last issue, where the reader can refer to them as the discussions come up.

At noon the topical discussions were taken up.

No. 1.—"Should brakebeams on four-wheel passenger car trucks be hung outside or between the wheels?"

Mr. MITCHELL: I notice in the *Daily Railway Age* an article on inside hung brakes, which covers practically the same points which Mr. Parke embodies in his letter to me, and I will furnish the Secretary with this letter so that he can include it in the proceedings. I will give the advantages which Mr. Parke claims for it and which I endorse.

This forward force being so far above the retarding force (at the rails) has a tendency to overturn the trucks; but because of the length of the wheel-base the trucks are not overturned, but a transfer of weight from the rear pair of wheels to the forward pair is inevitable. It thus occurs that in every application of the brakes the rear pair of wheels of a truck carries less weight to the rails than the forward pair. It is plain from this that the rear wheels are expected to slide first and as a matter of fact, which has been demonstrated by a recent test made by the Canadian Pacific, the rear wheels really do slide first, other things being equal.

The brake hangers are set at an angle to cause a more severe application of the brakes upon the forward pair of wheels than upon the rear pair. This is designed to compensate for the additional friction between the rail and the forward pair of wheels at the time of the application of the brakes due to the greater pressure of the forward pair upon the rails than of the rear pair. Ordinarily, with outside hung brakes, the hangers, such as are generally used on passenger car trucks, increase the friction of the brakeshoes upon the rear pair of wheels and diminish it upon the forward pair, which is precisely the reverse of what is desired. The reason why such a high braking power as 90 per cent. can be used with outside hung brakebeams is from the fact that a considerable amount of force upon the brake cylinder piston is used to overcome the resistance of the brakebeam springs. With the use of the inside hung brakebeam the necessity for release springs is entirely removed, since the angularity of the brake hanger tends to reduce the friction of the shoes on the rear pair of wheels. This permits the use of not only as high a braking power as when a portion of the power so employed is absorbed by the release springs, but also increases that braking power. This accounts for the remarkable efficiency displayed with this form of brake in the recent tests on the Canadian Pacific.

Another point of importance in the new apparatus is that with outside hung brakes the trucks are not only tilted forward by the inertia of the car body acting on the top of the truck to drag it forward while the braking resistance is at the bottom, the outside hung brakes adding to this tilting of the trucks upon the equalizer springs, but by hanging the brakebeams upon the inside and between the equalizer springs, the tendency of the brake application is to tilt the trucks in the opposite direction, thus partly offsetting the tendency of the forward movement of the body of the car to tilt the trucks forward. In the recent tests on the Canadian Pacific it was demonstrated that even when emergency stops were made there was a notable absence and comparative freedom from the jerking reaction when coming to a dead stop that is so often apparent when the brakes are hung on the outside.

In the new form of brakes the brakebeams and their

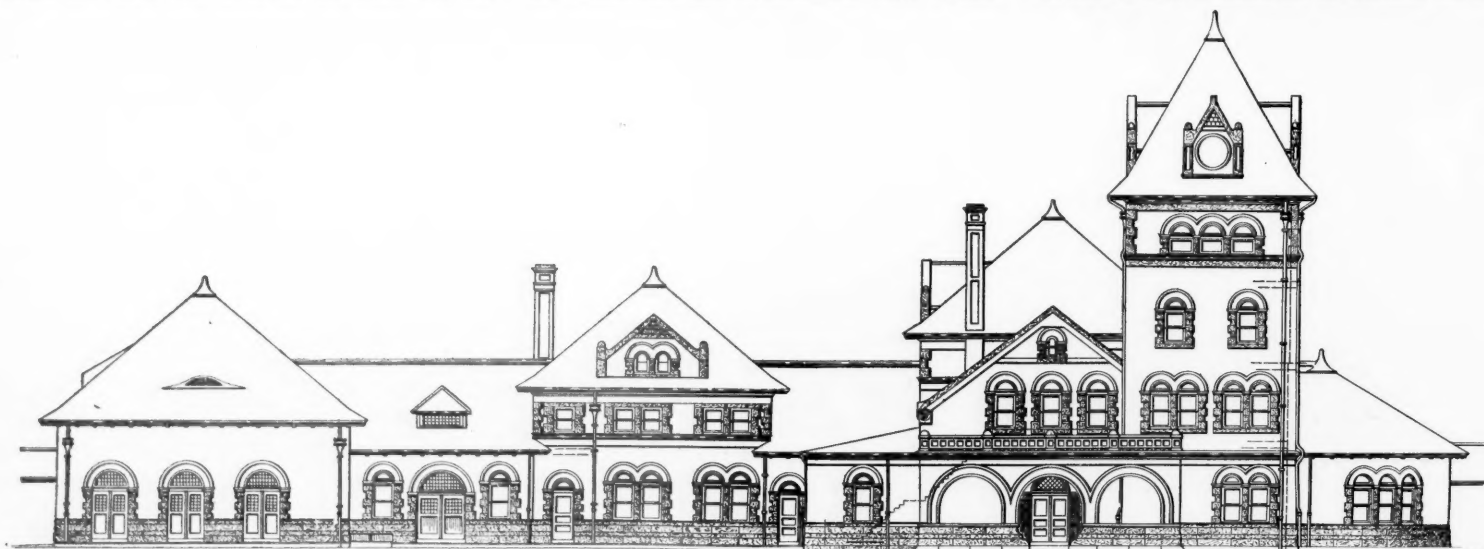


Fig. 1.—Passenger Station of the Boston & Maine Railroad at Manchester, N. H.—Elevation, Looking West.

same material. The principal rooms are finished in buff brick, with quartered oak above the cornice. The rooms having maple floors are sheathed with quartered oak.

In Fig. 3 the small circles indicate the location of electric lights. The solid black disks of the same size indicate pillars. The building is stiffened in the widest part by wooden trusses, which are shown in dotted lines across the general waiting-room.

The rectangles shown in the body of the general waiting-room indicate the location of seats, and those around the sides of this and other rooms indicate radiators. The entire building will be heated by hot water.

ard car so far as practicable with regard to general dimensions and design of standard metal sections, this in view of the speedy development and adoption of the all-metal car. He recommended the appointment of a committee to determine the life of axles, both iron and steel, the time which they may be run with safety and whether they should be condemned on a time limit. He recommended also a minimum size for drawbar tail pins and keys, and that a rule be adopted that the M. C. B. standards and their necessary attachments may be applied when practicable without marring cars or impairing their strength and be considered proper repairs.

attachments are of sufficient weight to drop the shoes away from the wheels by their own gravity, and not only save the expense and maintenance of the release springs, but obviate the necessity of interference with the action of the piston which must accompany their use.

Mr. WAITT: We have had four cars built, delivered the past week, equipped in this manner, and we have applied a brake leverage on the car 96 per cent. of the light weight of the car, based on tests made on the Canadian Pacific Railroad, whereby Mr. Parke stated that their equipment on which the test was made had this same brake leverage, and that they stopped the train in 20

per cent. less distance than with outside brakes and with less liability of sliding wheels.

Mr. BARR: With inside hung brake on a freight car I have seen cars bring switched with the brake set, and each time the direction of the car changed one pair of wheels would start to slide, changing with the reversing of the direction, always the rear pair of wheels sliding. With the four-wheel passenger car truck I do not see why that same phenomenon will not be produced.

Mr. BUSH: We have a great many cars with double brakes, both inside and outside. One disadvantage in having the brakebeam inside is inconvenience in getting at the brakeshoe. I have no doubt that the arguments given by Mr. Mitchell are valid.

Mr. HARRISON: I interested myself in this matter several years ago. We discovered this sliding of rear car wheels. We then attached the brake to the inside and tried to overcome the sliding of the wheel, but we never effected anything. I do not think you can detect any change by applying the brake inside as compared with the outside—the results are just the same.

Mr. APPS: Last month we made an experiment. We started out with 98 per cent. braking power, and we found the rear wheels would slide. We then decreased the power to 90 per cent., and ran along without any trouble, with the inside hung brake.

No 17.—“Advantages and disadvantages of the system of mounting car wheels as suggested to the New York Railroad Club by Mr. George Tatnall, February, 1897,” was then considered.

Mr. BARR: On straight track, frog impingement does not have any effect on wearing the points of the frog. Therefore for straight track the guard rail is of no use to prevent frog impingement, and the function which it

variation of $\frac{1}{16}$ in. for each wheel. Establishing as we have the distance of 4 ft. $6\frac{3}{4}$ in. as a maximum, and the matter which has been written having demonstrated clearly that the thickness of the flange must enter as a function into the proper distance between backs, we should, I think, accept our 4 ft. $6\frac{3}{4}$ in., and prescribe variations from that distance in the direction of lessening it.

Mr. BARR: I move that the gage from the inside of one flange to the outside of the gage point of the other shall not exceed 4 ft. $6\frac{3}{4}$ in. We may permit a certain distance less than that, but not more. We have adopted that as a dimension. Some of the dimensions, however, which we allow at interchange points will not conform to that; in other words, if we have a pair of wheels with a $\frac{1}{2}$ -in. flange on each, you can mount them to a distance which will pass inspection, but will not conform to the primary size. I would move that a committee be appointed to revise these figures. The matter was referred to the standing committee appointed by the association to report later in the meeting.

No. 2.—“What is the best way to overcome injury to trucks and track due to salt-water drippings from refrigerator cars?”

Mr. HIGGINS: This subject was first brought into prominence by a report made to the Central Railway Club, at the regular meeting held in January, 1896, and it was again referred to in the address of the President at the Master Car Builders' Convention of that year. At that time the damage was confined to the parts of the car trucks, to the track itself, also to metallic cattle guards and bridge floors. Recently, however, a new feature has been introduced, viz.: damage to bond wires of electric signals.

the Committee on Subjects, with the request that it be included in the list for 1898. Carried.

No. 3.—“Journal box lids. What reasons, if any, exist for or against the revising of our present standard in box lids?”

Mr. R. H. SOULE: In pursuing the work of the Committee on Standards, and in considering the replies received to their inquiries the fact came out very strongly that there was a general preference among the members in favor of the top hinge lid, as compared with the Fletcher or side hinge lid; the objection to the Fletcher form of lid being in general that the hinge lugs, both of the lid and of the journal box, would wear. When this wear extends beyond the hinge bolt the effect of the spring would be to make the opposite edge of the lid gap open. If this trouble could be overcome simply by the application of a new lid, it would not be serious; but this is not possible, and it can be overcome only by applying both a new lid and a new journal box, which is a very expensive expedient. Therefore, I felt in considering this matter we are entitled to limit the discussion to the matter of the top hinge lid and the net result. All my thinking on this subject is to the effect that the greatest promise of success lies in a construction and arrangement where the mouth of the journal box can be reduced to a perfectly plane surface and the face of the lid left the same. In order to make this practicable and successful, the journal box ought to be so constructed that neither the hinge lugs nor any other part of it will project beyond the face of the journal box where the lid is to be seated; similarly, the lid itself should be so constructed that it will have no projections beyond its seating face. Then, if the lid was so built and connected to the journal box that there was an articulated connection between the spring and the lid, so devised and arranged that when the lid was closed the spring bore on the center of the lid through this connection, the result would be that the lid would be forced downward at all points and you would have the most practicable and successful form of joint which can be devised, namely, two surfaces reduced to two planes and kept in contact.

Mr. HOLTZ: I have been using a lid hinged from the

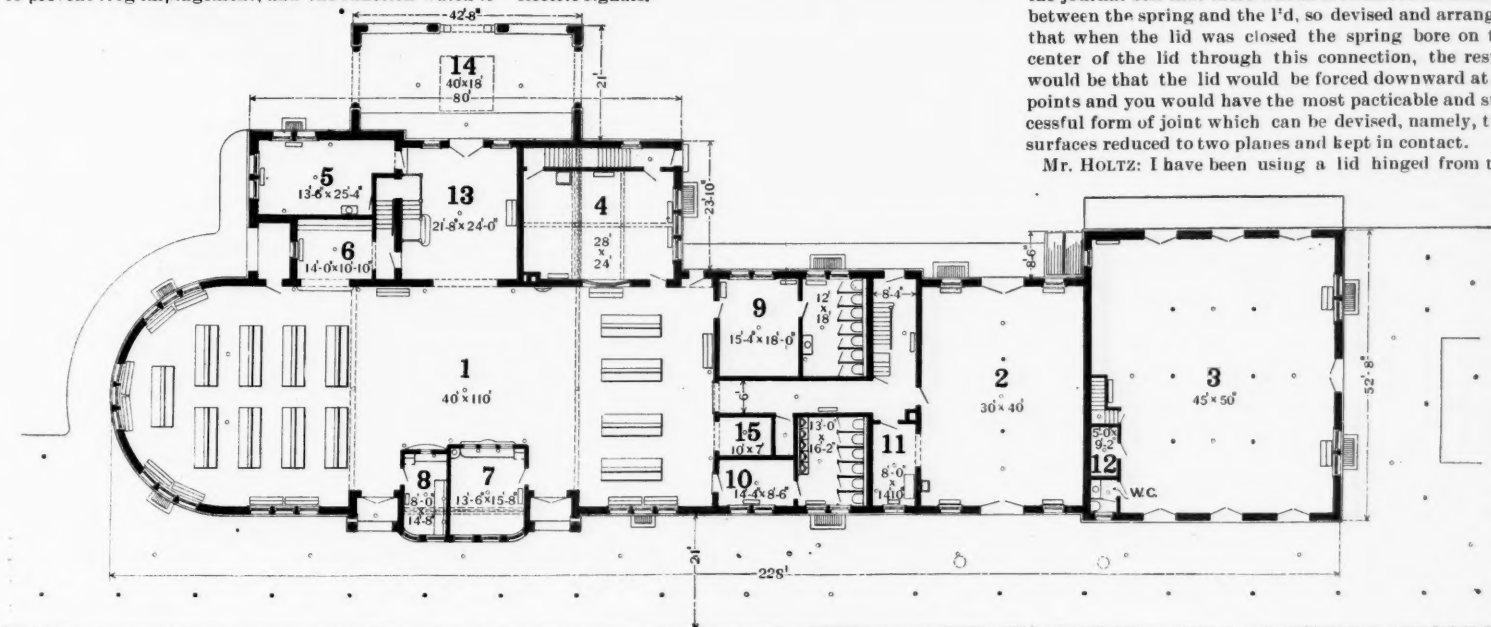


Fig. 3—Boston & Maine Passenger Station at Manchester, N. H.

NOTE.—The top of the drawing is east, the bottom west.

References: 1, general waiting-room; 2, baggage-room; 3, express-room; 4, dining-room; 5, agent's office; 6, news stand; 7, ticket office; 8, telegraph office; 9, women's retiring-room; 10, men's toilet-room; 11, parcel-room; 12, W.C.; 13, main vestibule; 14, port cochere; 15, public telephone office.

should properly perform is that it be so placed as to prevent derailment in case the wheel may forced into the opening between the throat and the point. I should say for a general figure if you will put your guard rail $2\frac{1}{2}$ in. away from the main rail on straight track you will overcome the guard rail blows and not hurt the frog. At the same time, if there should be some sudden jump that would enable the wheel to get on the frog point, the guard rail is close enough.

The circumstances are different when you come to a siding leading out or a frog on the inside of a curve. The guard rail there is important and may do some good. I should say for that point keep the guard rail up to the gage if you can. You are going to find it a difficult matter to do it. I can stand 200 ft. from a frog to-day that has been in service a month or two and tell you always which side that frog is worn, or make it 200 yds.; I think any of you can do it.

I believe that the most sensible thing is to say that we should use our gage and measure 4 ft. $6\frac{3}{4}$ in. from the inside of the thin flange wheel to the outside or gage point of the thicker flange wheel, and that should be the M. C. B. standard for mounting wheels. In remounting wheels, I think it is sufficiently near, when they are not over $1\frac{1}{2}$ in. thickness of flange, to remount them, as proposed to the paper, to 4 ft. $6\frac{3}{4}$ in., between the back or inside of the thick flange to the gage point of the outside of the flange of the other wheel, and you will never go wrong in that respect.

Mr. MENDENHALL: The position of the association is somewhat like this—we have adopted check gage distances 4 ft. $6\frac{3}{4}$ in., and we say it ought not to be exceeded. At the same time we recommend distances which, if added, would exceed that. I find in our shop practice that there is no disadvantage in mounting a pair of wheels to within the limits which we prescribed, $\frac{1}{4}$ of an inch. We can get do n without any great disadvantage to $\frac{1}{8}$ in., or a

That the salt-water drippings cause the damage is proven by the fact that the trouble is found to exist on the eastbound track, over which the refrigerator cars pass when loaded, and does not exist on the westbound track, over which the cars pass when empty.

On one division of the road with which I am connected, during a period of five months, trucks broke down under 15 refrigerator cars, and in every case it was due to the weakening of some part of the truck by the corroding effect of the salt-water drippings.

In order that relief may be obtained from this trouble, it will be necessary for the railroad companies first through this association to decide how the salt-water drippings can best be taken care of, so as to prevent the damage to the truck, track, etc., and then the railroad companies will have to take concerted action so as to have the owners of the refrigerator cars adopt the recommendation of the association. Since I arrived here I have been told that one of the largest companies in the country operating refrigerator cars had a plan in contemplation for doing away with the salt-water drippings entirely. They anticipate cooling the cars with some patent process involving the use of ammonia. If it is feasible, it will be a welcome solution of the problem.

Mr. WAITT: We have met with frequent complaints from our Chief Engineer on account of the deteriorating effect of salt-water drippings on our track, as the samples on the table will show, even on rails laid less than a year ago. On the rail of the eastbound track laid a year ago you will see scale nearly one-eighth of an inch thick, while the rail on the westbound track, which gets none of the drippings, is almost as clean as when laid. I have thought it might be desirable to have a small reservoir attached to these cars somewhere in the center for drippings to collect in, and that at division terminals where cars were inspected the reservoirs could be discharged by the inspectors as they go along.

Mr. GRIEVES: I move that the subject be referred to

top for nine years, with a lip on the inside. I have had excellent results. We have had ten coaches equipped with them for some six or seven years. Nearly all the tenders of our locomotives have it and a number of freight cars, and I don't want anything better.

Mr. SCHROYER: There are serious objections to the Fletcher lid. We have always used a wedge lid, to which we found certain objections, the most serious of which was driving the wedge lid out of the opening, which led to the practice among inspectors feeling the box to see if it was hot or needed oil, rather than looking into it. We took the top hinge lid with the joint along the sides and bottom of the box, which all top hinge lids have. These lids become defaced and bent as the result of service, and used to leave an opening, and dust was carried in. We then flanged the lid around the sides of the box, and the difficulty was multiplied, because the dust would strike the side of the box and it was deflected and carried up under the flange into the box. We then changed it and made a shoulder or rabbet it over at the side of the box, allowing the lid to close into the rabbet, so that there is no joint on the side of the box. Any dust striking the side is carried away from the lid. At the top of the lid we raise the upper part of the box up so that the dust will work away from the opening, and by these two methods we are getting good results in the use of the top hinge oil box lid. The rabbet is formed on the sides of box, so that the dirt, instead of having free access to the waste, passes by the end of box.

Mr. MCKENZIE: Does the rabbet extend around the lower end?

Mr. SCHROYER: On sides only. It is the motion of the car that makes a whirlwind, raising the dust from the track, and it is thrown against the side of the box and works its way in. We do not have any trouble in getting dust into the lower opening because the motion of the train carries it away

Mr. MORRIS: What sort of a lid do you use—gray iron, malleable iron or steel?

Mr. SCHROYER: We use malleable iron. We used compressed steel for a number of years and liked it. We make a malleable iron lid, weighing about $2\frac{1}{2}$ lbs.; we substituted those for the compressed steel. It retains its shape better.

Mr. JOHNSON: In the interchange of cars it is not always what fits that is applied. It is what is most convenient. I found some cases where the roads went to the trouble of reaming out holes and turning bolts and nuts to fit, but in the course of three months there would be a piece of iron bent down at both ends to hold the cover. You could drop a lead pencil in the space left. That is one of the disadvantages of the hinge lid.

Mr. HOLTZ: I use a malleable iron lid, lipped on the inside. I tap the bolt into the box and put the nut and cotter on it also. I never have any trouble with the lid springing or any trouble with dust in the box.

Mr. LEEDS: Have any of the gentlemen used a spring with its action controlled by end compression? We have used such a spring on our box lids for many years. It makes no difference whether the bolt fits within $\frac{1}{8}$ in. or $\frac{1}{4}$ in.; if there is only tension enough on the spring the pressure is directly down on the center of the lid, and it simply pulls itself down against and rests on the bolt, but the bolt has nothing to do with forming the joint. We have less trouble with that lid than the lids on the Pullman cars, which are called the Fletcher.

Supervision of the Standards and Recommended Practice of the Association.

Mr. R. H. Soule presented the report. On motion of Mr. Mendenhall the report of the Committee was received and spread upon the minutes, and the recommendations of the Committee referred to the Executive Committee for proper action.

Triple Valve Tests.

Mr. RHODES: The Committee on Triple Valves would report that no triples have been submitted to them for tests during the past year. We would also remind the members of this association and the railroad managers that the association has done a great deal of important and expensive work in investigations pertaining to the triples, and we think it advisable that the managers of railroads should know that the triples they apply to their cars conform to the standards of the association.

On Standard Wheel and Track Gages (to confer with the American Railway Association).

Mr. BARR: The American Railway Association has referred the matter back to this association, in view of the fact that the American Railway Association has adopted a standard gage of 4 ft. \times $8\frac{1}{2}$ in. I do not know that I have any recommendations at all in the manner. I do not know whether the association wants to say anything more about the subject at present.

Mr. POTTER: It has been suggested that now that the American Railway Association has determined on standard track gage and distance of guard rail from main rail it would be well to make some experiments to determine whether the present wheel gage is the proper one by which to mount wheels to run on 4 ft. $8\frac{1}{2}$ in. tracks. With that object in view I have been authorized to offer to this association the use of a portion of the track of the Cincinnati & Muskingum Valley Railroad, which was fitted up some time ago with a view to making such a test. The object is to determine whether wheels mounted according to the present wheel gage on track 4 ft. $8\frac{1}{2}$ in. will give the least resistance, or whether some different distance for mounting the wheels will give less resistance. If this association desires to conduct such experiments they are at liberty to use this track. The company will put it in good shape and only expect the association to bear the expense of making the test.

Mr. WAITT: I hope the association will act on the offer of Mr. Potter. The subject should be referred to the Committee on Gages, with instructions to arrange for these tests under the auspices of the association, with a view to determining the best gage for wheels. I make that as a motion. Carried.

Brakeshoe Tests

Mr. BUSH: The committee has no report to make. I might explain in this by saying that the previous investigations and laboratory tests seemed to cover the ground pretty well, and that since the presentation of the last report there does not seem to have been a sufficient development of the question in a sufficiently large number of new brakeshoe metals or compositions to justify tests on such a large scale just at this time. No doubt the development going on will make a test necessary a year or two hence.

Mr. MENDENHALL then read the report of the Committee on

Automatic Couplers.

Mr. WAITT moved that the report be received and open for discussion. Carried.

Mr. WAITT: The first recommendation of the committee calls for little if any discussion. Recommendation (2) calls for some definite action, in which they recommend a change in our designs in recommended practice and bring it under the list of standards; and I would move that that subject be submitted to letter ballot—the adopting as standard of the design of pocket strap, which is now recommended practice.

Mr. RHODES: I do not quite agree with the committee about turning down the ends of the yoke. At one time that was our practice on the Burlington road. We found that at small shops not fitted with forges sufficient to heat a yoke at one time that it necessitated three heats to get the yoke into shape. We have lately been endeavoring along with other roads to reduce the amount of work on the yoke at small shops by designing a yoke without the lips turned down and using two rivets as is contemplated in the M. C. B. standard if I understand it correctly. I would be sorry to see this association recommend as a standard yoke which in small shops will require three heats to make, when you can design one of equal strength and just as serviceable which can be formed in one heat either at a big shop or small shop.

Mr. BARR: From the experience of five or six years in which we have fitted all drawbars with pockets such as Mr. Rhodes described, two $1\frac{1}{2}$ -in. rivets, no turned down lip, I heartily side with him.

Mr. MCKENZIE: I do not agree that the lip should be left off. It is one of the necessities in taking care of the car where we are liable to make mistakes in putting on a pocket with $\frac{3}{4}$ -in. bolt.

Mr. LENTZ: In support of the position taken by Messrs. Rhodes and Barr on this question, I will say that the Lehigh Valley road, up to within the last few months, have used the strap with the lip; but recently we have abandoned that practice for the reason, principally, that we make the straps in our own shops and we find if we make them without the lip we save 7 or 8 cents a yoke, 14 or 16 cents a car.

Mr. LEEDS: As I understand it, if we favor the recommendation of Mr. Barr and Mr. Rhodes we have a standard which is adequate for all purposes. It does not prevent me from turning down the lips, as I certainly shall do; at the same time I am willing to adopt that as a standard and accept my cars home with drawbars applied in that manner, because I consider it safe as long as they put in proper rivets. If they deviate from the standard by putting in $\frac{3}{4}$ -in. bolts, I do not consider that is any fault of the standards.

Mr. CHAMBERLAIN: While I signed the report, I desire to say that I was not in a position to attend the last meeting of the committee. I am not a believer in the lip and the reason why I am not is the fact that I have never known a pocket on the Boston and Maine road, nor on the cars of a foreign road, straight without the lip, fitted with two $1\frac{1}{2}$ -in. rivets, fail in service. I am inclined to believe with Mr. Rhodes that pockets in small shops can be made more easily and answer the same purpose without the lips than with them. They are less expensive and just as practicable.

Mr. RHODES: I would move that it is the sense of this meeting that the turned-down ends of the yoke in recommended practice be changed now so that they will not be turned down. I do not believe it is necessary to refer the matter to letter ballot as standard, but we ought to correct what is evidently not the best construction in our recommended practice.

Mr. MITCHELL: I hope the motion to omit the lugs from the end of the strap will not prevail, for the reason that a great many of these strap yokes are applied at outlying points or some large car shops where mild steel is being introduced more or less in place of iron for riveting. We all know that mild steel, if it will take a temper, will harden, and I have seen rivet heads made with the mild steel where the heads fly off. I believe if the rivet is only sufficient to hold these strap yokes to the side of the coupler the lugs will still pull the load. We went into the thing carefully, and I believe the lugs are a proper thing to have. A statement was made yesterday that it costs 14 cents more a car to apply these strap yokes. We make them in one heat. We have three air cylinders with the bulldozer, one to bend the eyes in the center first, and the two side ones come up and bend the ends, and we run them through a saw while hot and saw the ends off smooth; and it costs no more to put them on than to leave them off.

Mr. WAITT: It is always recognized that our recommended practice should represent the highest type of any given article, both in efficiency and in strength. It is a good principle not to make a change in our practice which would make the standards less efficient under the circumstances we have to contend with in actual work. It would be a mistake to take the turned-down ends from the straps. There is nothing at all to hold the strap except the rivets. If the turned-down ends are retained, even though the bolts or bearings do not fill the holes, when there is a tension on them the lugs give a bearing.

Mr. GARSTANG: I rise to endorse what Mr. Waitt has said. The lip on the yoke is a factor of safety. It is said some of the yokes are found in the scrap heap with the lips broken off. That shows that the lips do some good.

Mr. MORRIS: Some two years ago we adopted the yoke with the lips as standard for our line. In that time we have had two yokes pulled off the drawbar and dropped on the track and causing extensive damage; but they were on foreign cars where the yokes had no lips. No car which was equipped with the lips on the yokes failed in that time, and I hope that the motion to eliminate the lugs from our recommended practice will not prevail.

Mr. HENNESSY: We have 16,000 cars equipped without the lugs. At one time we had 20,000 cars equipped with the lugs, the same dimensions of iron as now used in the M. C. B. tail pocket. Our experience with the lugs was very bad. Go through the yards and exam-

ine the cars very carefully and see if you will not find in a great many instances the lugs standing away from the shoulder against which it should bear.

Mr. MENDENHALL: If you have loose shop practice, by having the lips not fit, say, within a quarter of an inch, the lips will do no good. A simple calculation will prove that two $1\frac{1}{2}$ -in. rivets, if riveted hot, will take care of your straps without the lips; but on account of the methods of construction it is probable that there will be a great deal of loose riveting, and there will be cases where the repairmen at outlying points must necessarily put in bolts.

The Vice-President: The motion is that the turned-down ends on the yoke shown in the sheet of recommended practice shall be omitted from the yoke. The motion was defeated.

The Vice-President stated that Mr. C. W. Booth, General Auditor of the Baltimore & Ohio; Mr. L. F. Sullivan, Auditor of the Chesapeake & Ohio, and other gentlemen, constituting a committee from the American Railway Accounting Officers' Association, were present to confer with a committee of the Master Car Builders' Association, with a view to simplifying accounts, and it was desired that a committee be appointed to confer with them. Mr. Garstang moved that a committee of three be appointed to confer with the above-named committee. The Vice-President appointed the following committee—Messrs. Garstang, Haywood and Mitchell. The Chair also extended the privileges of the floor to the committee first named.

Uncoupling Arrangements for M. C. B. Automatic Couplers.

Mr. BLACKALL: I move as an amendment that where the couplers are operated from the side that the operating bar be 1 in. in diameter. Carried.

Mr. BUSH: I move that the report be received, and that the recommendations of the committee be submitted to letter ballot as recommended practice, and the committee discharged. Carried.

Interchange Rules.

Mr. RHODES: The first change suggested is in the preface; omit the words "have been largely modified," and "when away from home," and add to the end of the second paragraph the words "or improper repairs," so that the preface will read as follows:

"These rules make car-owners responsible for, and therefore chargeable with, the repairs to their cars necessitated by ordinary wear and tear in fair service, so that defect cards will not be required for any defects thus arising."

"Railroad companies handling cars are responsible for damage done to any car by unfair usage, derailment, accident or improper repairs, and they should make proper repairs at their own expense or issue defect card covering all such damage or improper repairs."

Mr. SANDERSON: I think there is a serious objection to inserting the words "or improper repairs." The original spirit of the Chicago interchange, which was afterward developed into the present system of rules, was to facilitate the movement of cars and reduce the rigidity of the inspection. I have heard it said, and know from experience, that we have all reduced our expenses for car inspection, accelerated the movement of the cars and increased the car earnings by loosening up the inspection. Now, if we hold the intervening roads responsible for improper repairs, which will naturally follow under the insertion of this item in the paragraph and in subsequent places as recommended by the Arbitration Committee, we are going to tighten up the inspection at every point. We will have to put back inspectors to carry out the rules at places where they are now dispensed with or reduced in number.

Mr. BENTLEY: I agree with everything Mr. Sanderson has said. Besides resulting in an increase of inspection force it will also be an incentive to persons who are inclined to be dishonest to leave off the repair cards, and it will make it a hardship on persons who comply with the rules and apply the repair card. It would certainly result in a delay of freight at interchange points. I think if the expense that has been incurred from the improper repairs to different roads is figured up, and then compared with the expense which would be incurred by the additional force of inspectors, delay to freight, etc., the balance would be largely in favor of not allowing these words to remain in the rules.

Mr. WAITT: I move as an amendment that after the words "improper repairs," in the second line of the recommendation we add the words "made by them," so that it will read "damage or improper repairs made by them."

Mr. LEEDS: The Arbitration Committee are at least upon the right track, but they should drop all repairs as improper unless caused by improper handling. They are evidently trying to head off that instrument of wholesale robbery the joint evidence clerk. In my opinion if improper repairs on account of unfair usage was introduced and improper repairs could be made to carry the car home and no bill made for it, I think we would be better off.

The amendment of Mr. Waitt was adopted.

The recommendation of the Arbitration Committee, as amended, was adopted.

Rule 3—Sec. 1.—The committee recommended as follows: Reverse the order of the second and third paragraphs and change the wording in the first and second lines as it now is, of the third paragraph, so that it will read as follows:

"If a car has defects for which the delivering road is responsible, or improper repairs not covered by a repair card, which do not render it unsafe (etc. to the end).

Mr. WAITT: I move that the paragraphs referred to shall read as follows: "Defect cards shall not be required for defects for which owners are responsible, except for missing material on cars offered in interchange; neither shall it be required of the delivering road for improper repairs, not made by it, with the exception of the cases provided for in sections 38, 45, 46, 47 and 48 of rule 3." The amendment was carried.

Sec. 5.—The committee recommended that the section be changed to read as follows: "Worn flange; flanges having flat vertical surfaces extending more than 1 in. from tread, or flange 1 in. thick or less. (See Fig. 4.)" Mr. Simons moved the adoption of the recommendation. Carried.

Sec. 9.—The committee recommend the following change: "Broken flange, caused by seams, worn through chill or worn flange. (See also section 14.)" Adopted.

Sec. 14. The committee recommended that the section be changed to read:

"Broken flange, except as in section 9; chipped flange, if chip exceeds $\frac{1}{4}$ in. in length and $\frac{1}{8}$ in. in width, or if it extends $\frac{1}{2}$ in. past the center of flange; broken rim if not caused by defective casting; if the tread measured at a point $\frac{1}{2}$ in. above tread is less than $\frac{3}{4}$ in. in width (see Fig. 3), or any breakage caused by unfair usage, derailment or accident." Adopted.

Sec. 15. The committee recommended the following: "Axles broken or with collars broken or worn out under unfair usage." Adopted.

Sec. 16. The committee recommended—underneath the limits for axles, insert the following words: "All cars to have their capacity stenciled on them." Adopted.

Secs. 29 to 33. The committee recommended the omission of these sections, and to add instead thereof a new section 29, as follows: "Defective, missing or worn-out parts of brakes which have failed under fair usage. Air-brake hose and fittings and angle cocks cannot be missing under fair usage." Subsequent paragraphs to be renumbered consecutively.

Mr. STEINBRENNER: I desire to have the hose retaining valve included. I make a motion to that effect. Mr. Steinbrenner's amendment was adopted, and as amended the recommendation was agreed to.

Sec. 38. The committee recommended to substitute in place of this section, as it now stands, the following: "Air-brake hose and fittings missing, or if 1-in. hose and fittings are found on $1\frac{1}{2}$ in. train pipe."

Mr. WAITT moved that the section be changed to read "Air brake hose or fittings, or both, missing, etc. The section was adopted as amended.

Sec. 40. The committee recommended to omit the words "except as provided for in Rule 5, Sec. 6." Add new paragraph to this section to read as follows: "Labor only can be charged against the owner for replacing missing parts, except locks, grain doors and all inside or concealed parts of car. See Section 5, Rule 6." Adopted.

Sec. 46. The committee recommended the substitution of the following:

"Cars intended to be equipped with link and pin drawbars if found with drawbars not fitting properly or not having sufficient strength. Such drawbars washed out to proper length must be considered as fitting properly. Such drawbars $1\frac{1}{2}$ in. longer than standard to the car must be considered as fitting properly." Adopted.

Sec. 47. Insert a new section with proper number to read as follows:

"Cars equipped with M. C. B. couplers having pocket rear end attachments and so stenciled, if found with tail-pin attachments instead of pocket." Carried.

Sec. 48. The committee recommended to add to this section the words "when offered in interchange," so that it will read as follows: "Uncoupling attachments of M. C. B. couplers, if inoperative when offered in interchange." Carried.

Sec. 49. Place the present section 49, covering improper repairs, next after section 48, without change therein. Place the material now given under note after section 48 next after the present section 49 with the following heading:

Combinations of Simultaneous Damage which Define Rough Usage

Sec. 50. Damaged couplers or drawbars or drawbar springs, accompanied by damage to either drawbar stops, filling blocks, draft timbers or their substitutes, or end sills.

Sec. 51. Damaged drawbar pockets, spindles or their substitutes, or followers, accompanied by damage to either draft timbers or their substitutes or end sills.

Sec. 52. Damaged drawbar stops or filling blocks, accompanied by damage to either coupler or drawbars, drawbar springs or end sills.

Sec. 53. Damaged draft timbers or their substitutes, accompanied by damage to either couplers or drawbars, drawbar springs, drawbar pockets, spindles or their substitutes, or end sills.

Sec. 54. Damaged wood or iron buffer blocks, accompanied by damage to end sills.

Sec. 55. Damaged end sills, accompanied by damage to either couplers or drawbars, drawbar springs, drawbar pockets, spindles or their substitutes, drawing stops, filling blocks, draft timbers or their substitutes, wood or iron buffer blocks, or longitudinal sills.

Sec. 56. Damaged longitudinal sills, accompanied by damage to end sills.

Sec. 57. Damaged longitudinal sills, if necessitating replacement or splicing of more than two sills.

Sec. 58. Damaged corner and end posts, if necessitating the replacement of or repairs to more than two end or two corner posts at one end, or more than one end and one corner post at same end of car.

Mr. WAITT moved the words "or followers" be omitted from Section 51. Carried. The sections as amended were adopted.

RULE 4.

Section 1. The committee recommended that sections 1 and 2 be omitted, and a new section 1 to take the place of these, which will read as follows:

"Section 1. Any car having defects which render it unsafe to run, unsafe to trainmen or to any loading suitable to the car may be repaired." Adopted.

Sec. 3. The committee recommended to omit this section entirely. Adopted.

Sec. 5. To be changed to read as follows:

"In repairing damaged cars, M. C. B. standards may be used when of dimensions that do not mar the car nor impair

its strength, in lieu of the parts forming its original construction." No action.

Sec. 6. Change the word "marked" to "stenciled." Adopted.

Sec. 7. Add to this section as it now stands the following:

"When M. C. B. couplers, knuckles or brakebeams are replaced under conditions which make them chargeable to the owner, it must be plainly stated on the repair card whether the material is new or second hand." Adopted.

Sec. 9. Add to this section as it now stands the following sentence: "The height to be measured from the top of the rails to the center line of the drawbar shank." Adopted.

Sec. 14. Add to this section, as it now stands, the following: "and in no case must they be reduced below the limits given in Rule 3, Section 16," so that it will read as follows:

"Sec. 14. The wheel seats of foreign axles must not be reduced more than one-sixteenth to fit the wheels, and in no case must they be reduced below the limits given in Rule 3, Section 16." Carried.

Sec. 15. The committee recommended to omit this section. Mr. WAITT moved that the section stand, with the following addition:

"except that companies applying axles smaller than the limits given in Section 16 of Rule 3, shall not be responsible for improper repairs if the cars are not stenciled showing the capacity." Carried. Mr. Rhodes moved to add a paragraph to Section 15, as follows: "Intermediate roads shall not be held responsible for any wrong repairs to draft rigging or axles, or wrong repairs to owners' defects not made by them." Adopted, and original section as amended stands.

Sec. 16. The committee recommended the first paragraph to be changed as follows: Omit the concluding words "be forwarded to the owner of the car on or before the 20th day of each month," and insert therefor, "be forwarded with the bill." If no bill is to be rendered, the repair card stub must be forwarded on or before the 20th day of each month, with the words "no bill" written across the face of the repair stub. In case it is not the intention to render bill, the words "no bill" shall be written across the face of the repair card.

RULE 5.

Sec. 1. Omit the words "against car owners," in this section, and add words at the end so that it will read as follows:

"Sec. 1. Bills may be rendered for work done under section 1 of rule 4, stating upon the bills the date and place where the repairs were made; the repair card stub or defect card to accompany the bill." Carried.

Sec. 5. This section to be replaced by a new section 5, to read as follows:

"When improper repairs of owner's defects have been made and bill rendered, the owner may counter bill against the company making the wrong repairs for the cost of changing the car to the original standard or to the requirements of Rule 4. When improper repairs of defects for which owners are not responsible are made, the owner may make bill against the company making the wrong repairs for the cost of changing the car to the original standard or to the requirements of Rule 4, if the work is done. The joint evidence of the owner of the car and the delivering road that the repairs are not proper shall be final." Adopted.

Sec. 6. The latter part of this section to be omitted and an insertion made so that it will read as follows:

"Bills may be rendered against car owners for the labor only of replacing material lost on the line of the company making the repairs, except as provided for in sections 38 and 40 of Rule 3."

Mr. Potter moved that M. C. B. be omitted from the section. Carried.

Mr. Hayward moved that "drawbars" be inserted after the word "couplers." Carried.

As amended the section was adopted.

Sec. 8. Add after this section the following new paragraph:

"When second-hand axles are applied under conditions which make them chargeable to the owners, the diameters of the journals of such axles applied should not be less than $\frac{1}{2}$ in. above the limit dimensions given in section 16, rule 3." Carried.

The Secretary read the following communication from the Committee of Conference from the American Railway Accountants' Association and the Master Car Builders' Association:

"Your Committee recommends that the last paragraph of Section 12, Rule 3, found on page 5 of the report of the arbitration committee be stricken out and the following substituted therefor and adopted by the Association: "Bills shall not be rendered for amounts less than 25 cents in aggregate, but charges for less than 25 cents may be held until they amount to that sum, provided the said aggregate is rendered within 60 days. No bills shall be returned for correction on account of errors for less than 25 cents, but requests shall be made for credits and adjustment in subsequent months. All officers rendering bills should consolidate all charges against any one company into one monthly bill."

Your committee further recommends that the M. C. B. Association appoint a standing committee to consider with the Committee of the Accounting Officers' Association questions relative to bills and accounting, such committee to report at each annual convention."

Sec. 12. In the list of prices, add after "Lumber..... per foot B.M." the words "required to make the part."

After the table of prices in this section, insert the following note:

NOTE.—In rendering bills for owner's defects, the following should be observed:

No credit for scrap and no charge for labor shall be allowed in renewing brake shoes.

Whenever scrap credits are allowable the weights of scrap credited shall be equal to the weights of the new metal applied, except as otherwise provided in the rules, and except in the case of link and pin drawbars, in which latter case the weight and kind of metal removed shall be credited.

Charges amounting to less than 25 cents shall be held until they amount to that sum or more, and also, charges against one company shall be embodied in one bill monthly.

Mr. HUMPHREY moved that the new section recommended by this joint committee, as above, be substituted for the last paragraph in Section 12. Carried and the section was adopted.

Mr. POTTER: I move that the report of the joint committee be accepted and the committee discharged; and that the recommendation to appoint a standing committee to confer with a committee of the Accounting Officers' Association be referred to the Executive Committee of this Association. Carried.

Mr. MCKENZIE: I move that a committee on prices be appointed by the chair as is usual. Carried.

The Vice-President appointed Messrs. Hennessey, Sanderson, Bush, Waitt and Purves.

Sec. 13, rule 5, was referred to the committee on prices.

Sec. 14. Omit this section as it now is and substitute therefor the following:

"When hose is replaced under conditions which make it chargeable to the owner, new material must be used."

"When M. C. B. drawbars, knuckles or metal brake beams are replaced, good second-hand material may be used, but in the latter case the charge shall be limited to 75 per cent. of the price when new." Carried.

Sec. 16. Omit the words "which must be." Carried.

Sec. 18. Mr. SANDERSON: Section 18 should be modified, so as to make it 60 days, instead of 4 months, in conformity with the action just taken. Carried.

Mr. Mitchell moved that the whole of section 19 and 20 be referred to the committee on prices. Carried.

Mr. Simons moved that in section 21, just before the word "manufacturer" the words "air brake" be inserted. Carried.

Sec. 25. Add after this paragraph, as it now stands, the following:

"With the following exceptions: Roof lost on account of decay or faulty construction, broken truck springs, truck transoms, arch-bars, column bolts, truck hangers and hanger pins, providing the damage has not been caused by derailment or rough usage. A switching road is a corporation doing the major part of its business on a switching charge, or one which does not pay mileage to car owners for the use of the owner's car." Adopted.

RULE 6.

Sec. 3. The committee recommended to insert after the words "defect card" in the fourth line, the following words: "Covering all defects of improper repairs for which owners are not responsible."

Mr. Bush moved to amend that the section should read: "Covering all defects or improper repairs made by them for which owners are not responsible." As amended the section was adopted.

Mr. Sanderson moved that section 4, of rule 6, also rules 7, 8, 9 and 10, be adopted as they stand, without being read. Carried.

Mr. Bush moved that the Chair appoint a committee to take under advisement the matter of a fee being paid by each side to a case submitted to the arbitration committee, and to report at this meeting. Carried.

The Secretary announced that the Nominating Committee had filed a report, making the following nomination of officers for the ensuing year:

President, S. A. CRONE, N. Y. C. & H. R., New York.
First Vice-President, E. D. BRONNER, Mich. Cent., Detroit.

Second Vice-President, C. A. SCHROYER, C. & N. W., Chicago.

Third Vice-President, J. T. CHAMBERLAIN, B. & M., Boston.

Treasurer, G. W. DEMAREST, North. Cent., Baltimore.

Three members of the Executive Committee to replace outgoing members:

W. S. MORRIS, SAMUEL HIGGINS, C. M. MENDENHALL.
The members of this committee holding over are Messrs. Rhodes, Leeds and M. M. Martin.

On Thursday President Crone called the meeting to order at 9:25 a. m. The President announced the first business in order to be the report of the Committee on Revision of Prices. The committee submitted the following report:

Revision of Prices.

The Committee on Prices was unable to obtain any definite data to justify it in making a recommendation as to the allowance of special prices of labor and material in repairs made west of the 105th parallel. The committee recommended the reference of the matter to a standing committee on prices to be appointed and to report at each convention. The committee recommended that wheel and axle prices, including labor, remain as in 1896; that the prices of material in section 12 remain as in 1896, but that the two sections in the table at the top of page 21 be removed from the table and placed as a paragraph at the end; that after "per foot B. M." the words "required to make the part" be inserted as recommended by the Arbitration Committee; that the last item "for helical springs" the word "per" be omitted; that section 13 about M. C. B. couplers remain as in 1896; that section 19 remain as it is with the following additions and with "knuckle pins" included in second note at end:

	Ord.	Refr.
	CARS.	CAR.
One end, corner, door on side post replaced.....	3	6
One journal box.....	2	
Two journal boxes on same axle.....	3	
One platform plank.....	1	
One spring plank.....	10	
One drawbar spring or drawbar on both.....	2	
One or two drawbar stops.....	2	
All drawbar stops at one end of car.....	3	
Rehanging old end door.....	$\frac{1}{2}$	
One side ".....	1	
One pin lifter.....	$\frac{1}{2}$	
One corner iron.....	1	
One truck spring.....	2	
One truck transom (wood).....	10	
Blacksmith shop labor in repairing one arch bar.....	2	

Mr. MITCHELL moved the adoption of the recommendation of the committee.

Mr. LEEDS: I notice that the committee did not make any change in the price of air-brakes. I move that the price be changed from forty dollars to thirty-two dollars. Carried.

Mr. HARRISON: In the price "one drawbar spring, two hours," the drawbar spring and drawbar are one and the same thing, so far as this goes. A man could make a charge of two hours for drawbar and two hours for drawbar spring, and thus double up the cost. Two hours should be sufficient to remove both drawbar and spring.

Mr. HENNESSEY: That is the intention of the committee and the change will be made.

Mr. HUMPHREY: As I was one of the Western members who appeared before the committee in regard to prices, and they conceded something, the appointment of a committee for the purpose of revising the prices that the Western representatives think have been unjust, I think we are getting something of a concession, and can at the next meeting secure something substantial. The general managers in the Western country are not well pleased at all with the prices that are fixed by this association, and I would move that the report of this committee be amended by making an arbitrary increase of 10 per cent. on all repairs made west of the 105th meridian.

After long debate Mr. Humphrey's amendment was put and lost.

Mr. Mitchell's motion to adopt the report of the committee was carried.

Mr. Potter, Chairman of the committee to whom was referred the question of fees for the Arbitration Committee, presented the following report:

Consideration was given to the proposition to require each party to a dispute to send with the papers a fee. Your committee think this inadvisable from the fact that a case should not be submitted unless it involves a principle or an interpretation of the rules. The benefits of a decision on such point will be participated in by all the members of the association and no burden should be imposed upon the individual members on this account; and, further, it being the opinion of your committee that if the parties desiring to submit a case to the Arbitration Committee be required to, instead of sending all papers that may have accumulated in the dispute, submit the case in abstract, clearly and concisely setting forth the point in dispute and their interpretation of the rules upon which their claim is based, such abstract being limited to three typewritten pages of ordinary letter size; and both parties being required to send the abstract, will not only result in a lessening of the labors of the Arbitration Committee, but in many instances the case can be settled before reaching that committee.

Your committee would therefore recommend the following change in Rule II after the word "Secretary": In the fourth line of the second paragraph cut out all to the period and insert the following: "An abstract, such abstract setting forth the point or points at issue, and each party's interpretation of the rules upon which their claim is based clearly and concisely, not exceeding three typewritten pages of letter size, and shall be signed by both parties to the dispute."

Mr. RHODES: There was a committee appointed to make some investigation on the question of gages. I think the chairman of the committee is ready to report.

Mr. BARR: The committee recommends that the second paragraph of the rules for mounting wheels on page 501 of the annual report of 1893 be changed to read as follows:

First.—That wheels with flanges worn to a thickness of $1\frac{1}{2}$ in. or less shall not be remounted. Last year we adopted as recommended practice that wheels with flanges less than $1\frac{1}{2}$ in. should not be remounted.

Second.—That the thickness of flanges fitted on the same axle should be equal and should never vary more than $\frac{1}{8}$ of an inch instead of $\frac{1}{4}$ in.

Third.—Instead of mounting wheels with 4 ft. $5\frac{1}{2}$ in. on the inside of the flanges, that practice be changed, that is, that this association recommends a departure from the principle of simply mounting wheels with that distance between flanges, as heretofore; and that in mounting wheels, either new or second-hand, the standard wheel check gage should be used in the following manner: After one wheel is pressed in position, place the stop *a* or *b* of the check gage against the inside of the wheel with the thinner flange, with the corresponding tread stop *c* and *d* against the tread of the wheel. Place the other wheel on the axle until the opposite tread stop comes in contact with the gage until the corresponding gage point *e* and *f* comes in contact with the outside of the thicker flange.

We present also a modification of Fig. 7. Taking this diagram it will read—Wheels are out of gage if less than 4 ft. $5\frac{1}{2}$ in. between flanges, or if more than 4 ft. $6\frac{1}{2}$ in. from the inside of one flange to the outside of the other.

We recommend to make the inside limit between the flanges 4 ft. $5\frac{1}{2}$ in., just as it has been, and make the outside limit not to exceed the maximum of 4 ft. $6\frac{1}{2}$ in. from the inside of one flange to the outside of the other, for wheels cast after Aug. 31, 1897. Also retain the present limit of less than 5 ft. 4 in. between the outside of tread. The only change in that is instead of making the outside limit between the flanges 4 ft. $5\frac{1}{2}$ in., we make the outside limit from the inside of one flange to the outside of the gage point of the other flange. We recommend that to be substituted in place of our present Fig. 7.

Mr. Bush moved that the report of the committee be received and approved, and the recommendations be submitted to letter ballot. Carried.

Mr. Waitt moved that the rules as amended be adopted as a whole. Carried.

The work of the Arbitration Committee, as contained in the cases submitted, which had been decided by it, was approved.

Mr. Leeds then read the report of the Committee on Loading Logs, Poles, Bark and Long Structural Materials on Cars.

Mr. WAITT: It would be wise for the recommendations of the committee to be submitted to letter ballot for adoption as recommended practice for a year. If no difficulties are found in carrying out the recommendations it could then be brought before the association by the Committee on Standards for adoption as a standard. I make that as a motion. Carried.

Trains Parting.

The report was read by Mr. Waitt and accepted.

Mr. SIMONS: It is necessary to get away from the present uncoupling arrangements and get somewhere under the coupler. Has the committee received any information which would lead them to believe that it is necessary to get away from the present uncoupling attachments?

Mr. WAITT: From the reports we have received giving the joint experience of roads in different parts of the country what Mr. Simons says is true. The uncoupling attachment overhead is all wrong, and so long as it is attached to the car and connected by lever or chain, we

are bound to have cases of uncoupling with M. C. B. couplers. It is time for the manufacturers to study out some device for the locking attachment, so that the uncoupling arrangement is not directly connected with the coupler, and excessive slack in the uncoupling attachment will not cause the lock to be opened and the knuckle uncoupled.

Mr. RHODES: The committee very properly calls attention to the fact that a large number of the causes of trains parting is due to the slack in the draft rigging, and they advise the use of buffer blocks as a means of remedying that defect. Much attention should be given to this point. On our road about a year and a half ago we had a thousand cars constructed with M. C. B. couplers and buffer blocks. These cars have run pretty much together in a special service in the same trains. We have had no trouble with them at all. In examining a number of them recently I found the draft rigging almost as good as when new. I want to urge the members, especially now as we have to maintain our own draft rigging at the expense of the car owner, not to lose sight of the importance of buffer blocks. Some are hesitating as to whether the buffer should be elastic or solid. A report submitted later will show that some of the spring buffers become solid with a blow of a 60,000 lb. car at a speed of 1.08 miles per hour, and another more powerful spring buffer becomes solid at a speed of 2.76 miles an hour. I am not prepared to say that a solid buffer would be a proper construction on an iron car, but with a wooden car we want a solid buffer.

Mr. WEST: Our company built 1,000 cars in 1890 with buffer blocks and since then 3,000 additional cars. I recently saw draft rigging put on in 1890 which was as perfect as when put on. The buffers are great savers in every way.

Mr. BARR: I do not understand how with the knuckles closed the buffer blocks can be effective and I question whether a guard arm was ever broken off an M. C. B. coupler when the knuckles were open. I believe that 99 per cent. of the broken guard arms occur from throwing cars together with the knuckles closed, and if we could have that stopped the buffer could get in its work.

Mr. SANDERSON: I think the greatest use to come from the dead blocks is in the protection of the cars in the train from train shocks, emergency applications and collision shocks, etc.

Mr. WEST: Also when trains part and come together. We keep a close record of break-in-two on our line; and in five per cent. of these cases the cars come together, and we are unable to find anything the matter when the cars couple up. The break-in-two is simply known by the shock of the train.

The Report of the Committee on Passenger Car Pedestal and Journal Box for Journal $4\frac{1}{4} \times 8$ in. was read by Mr. West and received.

The report of the Committee on Specifications and Guarantee for Cast-Iron Wheel was read by Mr. Barr and accepted.

Mr. ATTERBURY: Is it intended that the two drop tests are to be considered, either one in combination with the thermal test? I would infer that either one of the three tests can be employed?

Mr. BARR: The committee believes that either one of the three is amply sufficient to meet the requirements. If a company wishes to prescribe that two of the tests shall be used they are at liberty to do so. Either of the tests is sufficient to secure a good wheel.

My personal opinion is that the thermal test is the right way to test wheels. The breakage of the wheel depends very much on the temperature at which the iron is poured. Where the iron was poured hot, in certain tests that were made, the wheels cracked in one minute and ten seconds to one minute and fifteen seconds; taking as far as possible identical wheels and cooling down the iron for several minutes the time varied from two minutes ten seconds, the shortest, to four minutes and twenty seconds, the longest, with the exception of about 40 per cent. of the wheels which did not crack at all.

I believe it is practicable to use either of the three tests to get good, safe wheels, and of the three the thermal test is the best.

Mr. ATTERBURY: I will give a few figures which may be interesting. The last five years, from May 1, 1892, to May 1, 1897, 6,446 wheels cracked from the application of brakes on the Pennsylvania Railroad Division; in addition 242 wheels burst during the same period under P. R. R. and foreign cars, representing wheels from every manufacturer in the country. During that time there were 734 cracked Altoona wheels and only 8 broken. In figuring up the proportion of foreign wheels under P. R. R. cars as compared with Altoona make wheels, it is between 55 and 57 per cent. foreign wheels as against 43 per cent. Altoona wheels. It is evident therefore that the relation between the total wheels in the service is not at all comparable with the proportion of broken wheels. It would seem that there is something about our own wheels that gives us better service on the mountains than wheels which have not stood the thermal test. We have been making wheels from the same mixture for 20 years, and they will now almost universally stand the thermal test without difficulty.

I move that the language be amended in section 4, at the top of page 2, to read as follows: "And subjected to either of the following tests." Then go on with the drop tests and add to the beginning of the last paragraph of section 4 the words: "And in addition thereto a wheel must be laid flange down, etc."

Mr. LEEDS: I would like to see Mr. Atterbury's suggestion carried out. I have used the drop test on one wheel and the thermal test on the other wheel on passenger, tender and leading brake wheels for some time; and I know that a wheel which will stand both of these tests ought to be a pretty good wheel. I have been buying wheels under the specifications for a long time, and have met with no objections from the foundrymen. I am getting good service, both as to wearing value and safety. The combination of the two tests will ensure greater strength of the wheel.

Mr. Atterbury's amendment was adopted.

The President appointed the following gentlemen as the Memorial Committees:

David L. Barnes—Geo. Gibbs, Wm. Forsyth, H. G. Prout, Osgood Bradley—J. T. Chamberlain, G. W. Robertson, Robt. Purves.

R. E. Marshall—H. S. Hayward, R. H. Soule, G. W. Rhodes, Peter Smith—James Macbeth, C. J. Butler, A. C. Robson, J. Lightner—J. W. Marden, F. D. Adams, T. W. Adams, Joel West—J. H. McConnell, S. T. Case, R. W. Bushnell, F. H. Soule—A. M. Waitt, W. P. Appleyard, R. H. Blackall.

The noon-hour topics were then taken up.

No. 4. "What is the exact meaning of the latter part of Rule 5, Sec. 8, in connection with the replacement of wheels and axles?"

Mr. H. C. MCCARTHY: The latter part of the rule reads: "In case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged." The point that came up here has been that it is not explicit as to what the charge shall be for the parts that are damaged. For example, the owner receives a pair of wheels on a defect car. One wheel may have a chipped flange for which the delivering road is responsible. The next wheel is not damaged. The question then arises on account of the silence of the rule on the particular point, what the charge can be. Inasmuch as it is a question pertaining to an interpretation of the rule, it would seem as if the association should give it some attention in the way of discussing it.

No. 5. Would it be advantageous to adopt standard coil springs for freight car trucks? If so, what would be the best basis on which they could be selected?

Mr. SANDERSON: From the experience which I have had with a freight car truck spring coil since 1892, I believe I can safely assert that there is no good reason why the Master Car Builders' Association cannot, after proper investigation, adopt a standard freight car truck spring coil which can be used in multiples of four, five and six for all freight trucks of the diamond or lateral motion arch bar pattern. The Norfolk & Western Railroad in 1892 commenced using such a spring $6\frac{1}{2}$ in. long, 5 in. in diameter, made of $\frac{1}{2}$ in. round steel, weighing 11 lbs. and bought under specification to carry 3,000 lbs., at a height of $5\frac{1}{2}$ in. When looking up this matter for the purpose of another similar inquiry in 1895, it was ascertained by measuring a very large number of freight car trucks that springs designed so that they can be used in nests of four, five, six, etc., according to the capacity of the car, will suit the great majority of freight cars with arch bar trucks running in the United States to-day.

A few years ago, on looking at the scrap piles, it was almost amusing to note the various sections of spring steel which were found there; but since Mr. Cloud read his paper on the subject of helical springs before the Mechanical Engineers' Society, in 1884, showing very plainly and indisputably that a round bar is more effective and cheaper and in every way preferable to any other shape of bar for coil springs, these curious and wonderful sections of steel bars have very largely disappeared from our freight car truck springs.

We all know more about coil springs since that time, and it is believed that the time has now arrived for adopting standards. We still hear occasionally of the merits of the graduated freight car truck spring, but they are being less and less used every day. This, may I call it "folly," hung on for a long while. Its long life was largely due to the vigorous support it received from our supply friends who were interested in the sale of its various patterns, and who, in presenting its merits, were well loaded with plausible reasons why it was an absolute necessity. At the same time it is hard to understand why a freight car made to carry 60,000 lbs. of freight without jolting to pieces should not be capable of carrying its own weight when empty without jolting to pieces unless it is supported on springs of more easy motion than those which were intended to carry it when loaded, and yet this was the argument on which the graduated spring was put on the market and sold. There is another question which must have some influence on the design of a standard freight car truck spring coil, and that is the deflection. The recently established United States law regulating the height of the centers of drawbars makes a considerable deflection of truck springs undesirable.

The coil truck spring used by the Norfolk & Western is used in groups or nests of four to 40,000 capacity cars, five to 50,000 capacity cars, six to 60,000 capacity cars, and has been a perfect success, both as regards cheapness, durability, ease of application and reduction of stock carried. It is not now asserted that this is the best coil that can be used for the purpose, as the strength of it is a little too much for the load when used in groups of six (6) for 60,000 capacity cars; possibly a spring which will stand about 3,200 lbs. or 3,150 lbs., at a height of $5\frac{1}{4}$ in., would be a better all-around spring than the one mentioned.

It is believed that a committee of this association should be appointed to take up this question and see if they cannot prepare, with the aid of those members who have had experience in this line, designs for Standard Master Car Builders' truck spring coils to be used, if possible, in groups or nests of four, five or six under the bolsters of arch bar trucks carrying cars of 40,000, 50,000 and 60,000 capacity, and possibly, also, in groups of seven and eight, where the cars are of 70,000 and 80,000 capacity, and also at the same time to recommend designs for standard M. C. B. springs, probably consisting of two or three coils, one inside of the other, to be used on the journal boxes of pedestal trucks of designs similar to Fox, Schoen or other pressed steel or built up truck frames of this pattern.

Mr. WAITT: I believe the subject presented by Mr. Sanderson is one of much importance and will bear looking into thoroughly. I indorse what he has said and would make a motion to have the subject of standard coil springs for freight car trucks referred to a committee for a subject of investigation during the coming year. Carried.

No. 6.—Copper sheathing for passenger cars. How is it applied and what are its advantages?

Mr. APPELYARD: I will simply state what we have been doing on the New York, New Haven & Hartford road. [This has been described in the *Railroad Gazette*.]

No. 7.—"Is the retention of dummy couplers on freight equipment desirable?"

Mr. BRAZIER: The present dummy coupling is not

a success, no matter where located. If located as formerly it ruins the hose by kinking same; if located under the drawbar it is unhandy to get at, and trainmen will slight its use when cutting and switching a train on account of the position they have to get into to accomplish the work necessary, and on account of the time required.

The coupling is defective inasmuch as it permits of the hose being hung upon it in other than the proper way to cover its opening; that is, hose can be hooked to the dummy in such a way that the opening will not be covered at all, and in this position hose will naturally collect more dirt than if it were allowed to hang loose.

There is no doubt in my mind as to the necessity for some means of protecting the air equipment when hose is uncoupled to keep dust and cinders from reaching the triple valve, and to prevent snow and sleet from blowing into hose and freezing.

I think a new form of coupling is needed, or the hose coupling should be provided with an automatic arrangement for closing the openings when uncoupled, and then the hose could be allowed to hang. The latter arrangement would probably be the best, as it would obviate the necessity of relying on a peculiar class of trainmen to obey instructions.

MR. RHODES: We abandoned the use of dummy couplings because they were applied in a bad manner. It produced a kink in the hose. When we abandoned its use we took the precaution of never allowing the hose to get less than 4 in. from the top of the rail, and our experience has been satisfactory without the use of the dummy. If there was some method by which the opening of the hose could be covered when it is closed it is better than having it left open.

MR. SCHROYER: We took off the dummy couplings, but have not been satisfied. Scarcely a week goes by but we have letters from the men complaining of the difficulty they have in consequence of dust in the strainers and valves. Our practice is to hang our hose 6 in. above the top of the rail. I am of the opinion that some device put in the hose to close it when uncoupled would be excellent. I have never seen anything better than the original device used for that purpose by the Westinghouse Company, and which has been abandoned, I presume, on account of its obstructing the air passage. We have had several devices in the shape of clamps, but they freeze tight to the gasket in the winter, and in opening them pieces of the gasket are torn off. This produces a leak, and it is impracticable to use them.

MR. HIGGINS: Our road has not as yet abandoned the dummy coupling. We think the dummy is better than nothing, and furthermore we do not find, with the location we have, any serious trouble with the kinking of the hose. Mr. Brazier spoke about the hose being hooked up improperly on the dummy coupling. With the latest type that is impossible; they have either got to hang it up properly or not at all.

No. 10.—Is it wise or practicable to establish test laboratory bureaus for railroad companies? If so, what plan would be best?

MR. SANDERSON: It would be a great boon to the managers and motive power officials of large and small railroads if some plan could be devised whereby facilities for testing materials, such as are generally used by railroads, could be readily provided at small cost.

From a manufacturing or supply man's standpoint, it ought to be and I believe is much more satisfactory to manufacture and sell materials on a definite specification.

I believe it is practicable to establish at half dozen or so conveniently located railroad centers well equipped chemical and physical laboratories for the purpose of testing paints, oils, metals, soaps, etc., in charge of competent men with competent assistants who should be paid good salaries to obtain the best talent; these laboratory bureaus to be under the charge of a board of directors or executive committee appointed by the railroads, and to be equipped and supported by an initiation fee and annual dues paid by the roads on some equitable basis, say, the number of cars or engines owned by each company.

The report of the Committee on Air-Brake and Signal Instructions was read by Mr. Grieves.

Mr. Mendenhall moved that the subject be referred back to the committee for revision. Carried.

On Friday the first report was that on

Freight Car Buffers.

Mr. Brazier read the report, which was received, as follows:

Your committee has had its attention called to only two improved freight buffers, namely, the Gould spring buffer, and the Westinghouse friction buffer.

The Gould buffer consists of two malleable iron cases, each containing helical springs, having a capacity of 12,000 lbs. each. The total capacity of the buffer is therefore 24,000 lbs. A number of these buffers have been placed in service on the Lake Shore Railroad, and a few for trial on the Erie and the C., B. & Q. The tests have been simply those for endurance in ordinary service, and the results in that respect have been satisfactory. The cost of cast-iron buffers, M. C. B. pattern, is about \$3.60 per car; malleable iron, \$4.40. The Gould spring buffers cost \$15 per car. The capacity of the Gould buffer, 24,000 lbs., is only sufficient to absorb the work done by a loaded 60,000 lb. car, total weight 90,000 lbs., running at a speed of 1.08 miles per hour.

The improved Westinghouse friction draft gear is shown in Fig. A. It has been in service on 50 coke cars for eight or nine months, and has required slight repairs to but few of the cars. The committee witnessed a test of the draft gear on these cars, after eight months' service, on the southwest branch of Pennsylvania R. R. The loaded cars, having a total weight of 58,600 lbs.,

were thrown together at speeds approximately four to six miles an hour. Under such conditions the motion of compression was 2 to 2½ in., and the capacity of the draft gear just about absorbed. A shop test of one of these gears was then made under a drop weighing 16,000 lbs., and it was found that a fall of 9 in. just closed it through a motion of 2 in. In order to get an approximate idea of the pressure required to produce an equal amount of work, a copper disk 2½ in. diameter and 2½ in. high was placed under the same drop and the weight allowed to fall 9 in. The compression of the copper disk was ⅝ in. A similar disk was then placed in a compression testing machine and it required 152,680 lbs. to reduce the height ⅝ in. This can, therefore, be taken

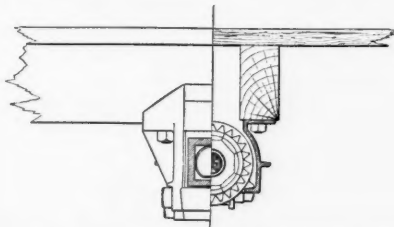
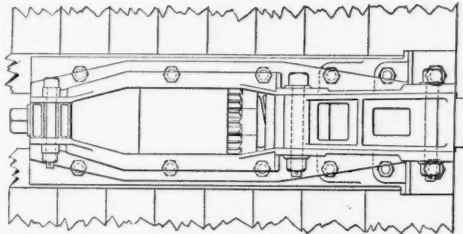
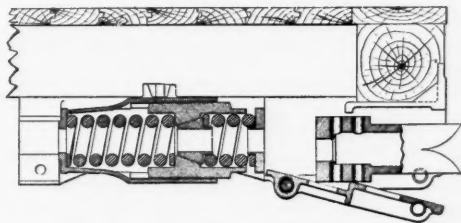
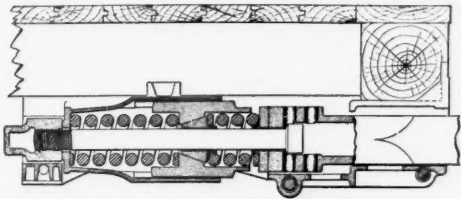


Fig. A—The Westinghouse Friction Draft Gear.

as the total capacity of the Westinghouse draft gear. As the spring resistance is 15,000 lbs., the value of the frictional part of the device is 152,680 — 15,000 = 137,680 lbs. It will be seen that more than nine-tenths of the resistance is by friction. As this is the controlling resistance, and as it acts in both ways, that is, in recoil in either direction as well as in compression, it will be evident that it exercises a braking action upon, and effectually checks, the recoil of the springs. This recoil of spring action frequently causes trains to break in two and racks the draft rigging and car framing. To eliminate these destructive forces is the main object of the Westinghouse draft gear. The work done in compressing it, as shown by the drop test, is 12,000 ft. lbs. The resistance of the standard draft spring is 1,583 ft. lbs.; therefore 7.5 is the ratio of the resistance of the Westinghouse draft gear to that of the standard draft spring. This former will, therefore, absorb 7.5 times the shock absorbed by the ordinary draft spring. This draft gear is now being fitted to the 600 steel cars, 100,000 lbs. capacity, building for the P. B. & L. E. R. R. We have no recommendation to make.

This committee consists of Messrs. Wm. Forsyth, A. E. Mitchell, F. W. Brazier, Thos. Bildes, John Player.

MR. RHODES: The committee give data in regard to resistance. The ordinary M. C. B. spring buffer will compress at 1.02 miles per hour. The Gould device added to the ordinary M. C. B. draft spring will compress at a speed of 1.40; Westinghouse at 2.91. As soon as the spring becomes compressed they are, for all intents and purposes, solid; and therefore are after that no better in preventing shocks to the draft rigging than a solid buffer. The solid buffer is applied against a springy medium, and ought not to be regarded as an entirely solid buffer; it makes a very good and cheap device for saving the racking to the draft rigging of the cars.

MR. WAITT: The buffers should be made so that the resistance is taken up in line with the strongest part of the frame of the car; in other words, in line with the sills of the car. For that reason I like the common cast-iron dead block or a spring block. The spring has some advantages which are worthy of consideration. We would hardly want to pull a solid buffer on a passenger car. There would be some objections to that. Now, we are running our freight trains at a speed approaching that of passenger trains. Everything we can get to reduce the shocks to a minimum is desirable. It is a question whether the spring buffers in the market now are stiff enough.

MR. MORRIS: The recommended practice is 22 in. between dead blocks. It does not seem to me that is right. It was designed for the old link and pin coupler, and we have to cut out the corners of the bottom part of the dead block in order to clear the guard arm of the coupler. Now that we have cars of a standard height I think the measurement of 24 to 26 in. is generally used on passenger cars. If this is considered a proper change by the association, I think it would be wise to make these measurements conform closer to what we are using on passenger service. I move that this matter be referred to the Committee on Standards.

THE SECRETARY: There is no question here for reference as standard or recommended practice. The question is of a nature which cannot be referred to ballot; it is simply for information.

MR. WAITT: I would move that the detail of our present recommended practice for the iron buffer block, with the spacing from center to center, and enough dimensions to locate the height and width of the buffer blocks as they are applied on the cars, be submitted to letter ballot for adoption as a standard. Carried.

Box-Car Side and End Doors.

Mr. Hennessey read the report, which was accepted.

MR. BRAZIER: If we did not have an outside seal on end doors the door could be tampered with and it would not be seen; and we would have more trouble than we do with a lock inside and a seal outside.

MR. SOULE: I move that the recommendations of this committee be submitted to the membership for letter ballot for adoption as recommended practice. Carried.

The next report was on Arch Bars and Column Bolts for Diamond Trucks, which was accepted.

MR. WAITT: I move that the design as presented by the committee be submitted to letter ballot as recommended practice. Carried.

Designs for Steel Car Frames.

MR. WAITT: I move that the recommendations of the committee in regard to these dimensions for the interchange box car and also the two flat bottom gondola cars, also the recommendation of a uniform measurement of 70 cu. ft. per ton of 2,000 lbs., be submitted to letter ballot for recommended practice. Carried.

MR. WAITT: I move that the committee be continued with a view to getting such criticisms as the members may be able to make after studying the designs more carefully, and if possible the committee to harmonize their views into one or two recommended designs.

MR. BARR: There are three members of the committee presenting three different designs. It would be much better to appoint another committee.

MR. JOUGHINS: As a member of the present committee I feel exactly as Mr. Barr has expressed himself, that it is not expedient to continue the present committee. An entirely new committee ought to be appointed.

MR. GARSTANG: I would offer an amendment to Mr. Waitt's motion, that a new committee be appointed. Mr. Waitt accepted the amendment, and the motion was carried.

Messrs. BARR and JOUGHINS then read their individual reports, attached to the general report of the committee, and printed therewith. Mr. Sanderson presented the following:

As now submitted the design will weigh less than a wooden frame car of the same general dimensions and will be much stronger. In preparing this design the following eight conditions were considered to be essential and have been as follows:

First.—Nothing but commercial steel shapes are used. Second.—Every part is easy to get at or inspect. Nearly all the rivets can be conveniently driven by power when building the frame and all can be easily driven by hand in the repair work.

Third.—Plenty of rivets have been used and they are as far as possible arranged to be in shearing strain and to be all equally strained. Fourth.—The main strength, foundation or backbone of the frame is in the center sills, which are so placed that they can take collision shocks in direct compression. These are so stiffened by the top and bottom plates that they cannot well be deflected and will stand enormous blows before giving way in any direction. The ends are so well re-enforced and protected so as to distribute the shocks over the entire cross-section of the backbone as much as possible.

Fifth.—Wherever holes are punched in the flanges of the channels additional material has been provided in the plates, etc.

Sixth.—The depth of the center channels is such and they are so placed that both collision and draft shocks will be transmitted through them longitudinally by direct compression without any tendency to cause deflection.

Seventh.—Vertical strength has been obtained with very moderate weight without the aid of truss rods. All the fastenings being by riveting, when once properly put together, each part performs the duty and stands the strains it is designed for.

Eighth.—The greatest possible horizontal rigidity of form has been striven for and distortion without absolute destruction rendered almost impossible. To make a car frame flexible without inviting cracks and failure would require that it be built largely of wood and tempered spring steel. The place for the elastic resistance is in the draft spring or spring buffers and not in the frame, which should be as rigid as possible, and which, when it receives a shock, should be able to take it as a whole without distortion.

Pedestals and Oil Boxes.

The Committee on Standards, to whom was referred the recommendations embodied in the report of the Committee on Passenger Car Pedestal for Axle with Journal 4¼ × 8 in., begs leave to report that in its judgment the Committee on Pedestals ought to be continued, and ought to be merged into the committee which it is assumed will be appointed on the recommendation already made by the Committee on Standards, to adapt the present standard journal box for use in trucks (whether passenger or freight) having pedestals. The committee continued to be designated, however, as the Committee on Passenger Truck Pedestals for axles with journals 4¼ × 8 in., and on journal boxes for use in trucks (whether passenger or freight), involving the use of a pedestal and an axle with journal 4¼ × 8 in.

(Continued on page 442.)



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The railroad gross earnings for May fulfill the promise of the first weeks of the month, and 131 roads, as reported by the *Chronicle*, show an increase of \$1,942,782 as compared with last year, or 5.14 per cent. Nine roads out of the list show increases in gross of over \$100,000 and 23 show more than \$30,000. The greatest gain is on the Mexican Central, \$289,000. The Canadian Pacific follows with \$223,000, then the Missouri Pacific with \$195,000, Great Northern with \$188,000, the Illinois Central with \$150,000, Kansas City, Pittsburgh & Gulf with \$140,000, Mexican National with \$127,000, New York Central with \$104,000 and the Chicago, Milwaukee & St. Paul with \$102,000. The Southern, the Louisville & Nashville, Northern Pacific and the Texas Pacific all show substantial gains of upward of \$68,000. The grain movement was quite heavy. The receipts of all cereals at the Western primary markets aggregated 37,613,000 bushels against 26,091,000 the year before. The live stock movement into Chicago was a trifle less than the year before, but the receipts of live hogs at that point were larger than in any recent year, aggregating 729,748 head.

It was a happy thought and an unusual event to send the battleship Texas to Fort Monroe for the inspection of those who attended the mechanical conventions there. The thought came from Mr. Trigg, the enterprising President of the Richmond Locomotive Works, where the engines were built. It occurred to him that the steam machinery of this ship would have a particular interest for the members of the associations, as having been built at a locomotive works, and as showing the genesis, so far as that particular works is concerned, of the practice of expanding the steam more than once in a locomotive. He also thought that this would be a capital opportunity to add to the interest in and knowledge of the new navy among an influential body of citizens. A letter to the Secretary of the Navy brought a prompt reply from Mr. Roosevelt, Assistant-Secretary (then acting Secretary) saying that the Texas would be sent if the requirements of the service permitted, and in due time Mr. Trigg was informed by the commander of the North Atlantic Station that the ship would be sent to Hampton Roads for five days. The action of the Department in this matter was liberal and enlightened; the navy and the locomotive works got a good advertisement and the members of the associations added to their stock of ornamental and useful knowledge.

Iron and Steel in 1896.*

Concerning the causes of prosperity or adversity in business, everybody has a right to his own opinion, and after all it is mostly mere opinion. The Secretary of the Iron and Steel Association is a staunch and

consistent high tariff man by virtue of his office, and no doubt as a matter of conviction also. Therefore it is inevitable that he should make Mr. Cleveland and the Democrats and the Wilson tariff chiefly responsible for the hard times of recent years, although he detects other influences at work part of the time. For instance, "the boom in the iron trade of 1895 succeeded, and the year as a whole was one of great activity, but this activity began to lag . . . the boom had collapsed because it fell into the hands of speculators and because the country as a whole was not prosperous under the Wilson tariff." He admits, however, that the nomination of Bryan affected business "almost as seriously as after the Cleveland panic of 1893." After the election of McKinley and the Republican Congress there was an improvement in the iron trade, but "the year closed with disappointing revelations, and down to the present moment most industries have been depressed and discouraged in the extreme and the iron trade prices have fallen steadily and are now lower than they have ever been, while wages have very generally been reduced since the first of January."

The Secretary of the Association develops very briefly and cautiously his notions of the cause of this disappointing sequence (not consequence) of the fall elections. The Senate did not promptly pass the House Tariff bill under which the business of the country would have been greatly benefited; but he admits that there is a growing sentiment throughout the country that other causes have contributed to the depression. One of these is Bryanism, another is the great productive capacity in mining, manufacture and agriculture, another is overbuilding of railroads and still another is hostile legislation against railroads. Still, he confidently states that "notwithstanding these unfavorable conditions every branch of business in this country would be placed on the road to prosperity by an early and wise revision of the tariff." We may safely endorse this if we place a very strong accent on "wise," but men's ideas of what would be wise in this way differ very widely.

About Dec. 1, following the election, the wire nail pool came an end and prices fell, and in the same month the billet pool was dissolved and the price of steel billets fell several dollars a ton. Later in that month the railmakers reduced the price from \$28 to \$25 at Eastern mills. In February "occurred the most sensational and probably the least expected event in the iron trade in this country that has happened in many years." This, it is needless to say, was the dissolution of the Steel Rail Association, when prices fell within a week from \$25 a ton to \$17, and perhaps still lower. The present prices at Eastern mills are \$19 and \$20. In May the beam pool went to pieces and prices have declined from \$1.70 per hundred pounds to \$1.30.

Naturally, the low prices which have prevailed for some years have stimulated exports. In 1896 our exports of iron and steel and their manufactured products amounted to \$48,670,000; the year before they had been \$35,072,000, and for the last four calendar years these exports have exceeded the imports, the aggregate in the four years having amounted to \$143,815,000, while the aggregate imports were \$95,779,000.

There have been four periods of exceptionally low prices for iron and steel since the close of the civil war, namely, after the panic of 1873, in 1884-85, from 1891 to 1895 and 1896-97. No. 1 foundry pig was quoted at Philadelphia (the lowest quotation) at \$16.50 in the period from 1873 to 1879. In 1884-85 the lowest price touched was \$17.50; in the 1891-95 period it was \$12 and in the last depression the lowest price was \$11.75. Bessemer pig at Pittsburgh went down to \$19.50 in 1873 and fell to \$17 in the second period of depression, to \$9.95 in the third and to \$9.25 in the last. Steel rails at the Pennsylvania mills were quoted at \$40 a ton at the lowest point of the first period of depression, at \$26 in the second period, \$32 in the third and \$17 is given as the lowest price touched after the breaking of the pool.

The production of pig iron last year is given as 8,623,127 gross tons; the year before it was 9,446,308 tons; in 1894 it fell to 6½ millions; in 1893 it was 7½ millions; and in 1890 it was 9½. This includes spiegeleisen and ferro-manganese. For the first time in the statistics of the country the production of basic pig iron in the United States has been ascertained. That amounted in 1896 to 336,403 tons. The production of Bessemer pig was 4,654,955 tons, being just about a million tons less than in 1895 and a little more than a million tons more than in 1893.

The Bessemer steel ingots produced in 1896 amounted to 3,919,906 gross tons. This was a million tons less than in 1895, 349,000 tons more than in 1894, 700,000 tons more than in 1893 and 250,000 tons less than in 1892. In open-hearth steel the production

has increased greatly in the last few years. The open-hearth ingots and direct castings amounted in 1896 to 1,298,700 tons; in 1891 the quantity was 579,753 tons. The production of crucible steel in the United States in 1896 was 60,689 gross tons and in 1890 it was 71,175 tons, the production in the intervening years having fluctuated within a range of 33,000 tons between the lowest and the highest.

The production of rails of all kinds, including light and heavy and street, electric and mine rails, in the United States in 1896 was 1,122,010 gross tons against 1,306,135 tons in 1895, a decrease of more than 14 per cent. Of this output 1,102,892 tons of Bessemer steel rails were rolled from domestic ingots; 705 tons were rolled from open-hearth steel and 4,347 tons of iron rails. The production of iron and steel structural shapes was 495,571 gross tons; the year before it had been about 22,000 tons more. The production of plates and sheets amounted in 1896 to 965,766 tons, being about 25,000 tons less than in the previous year, but 283,000 tons more than in 1894.

There was an important increase in iron and steel shipbuilding. In 1896 the iron and steel vessels built amounted to 60 in number and 113,220 gross tons; the year before 43 vessels had been built of a gross tonnage of 48,594. In 1893 sixty-five vessels were built, but the gross tonnage was only 94,532 tons. Vessels for the United States Navy are not included in these figures. All of the vessels built in 1896, except five steel schooner barges and six steel barges, were steamers and only one iron vessel was built.

In Great Britain the production of pig iron for 1896 amounted to 8,563,000 tons, being about 860,000 tons more than in the previous year, and, in fact, the heaviest production that we find in Mr. Swank's tables, except in 1882, when 8,587,000 tons were produced. It will be observed that our production, 8,623,000 tons, was greater than that of England. Indeed, we have surpassed England in this industry several times. In 1895, for instance, we produced 1,740,000 tons more pig iron than England. In 1892 we produced 2,450,000 tons more and in 1890 our production was 1,300,000 tons more. The British production has been astonishingly regular for 20 years, with, in the end, a considerable increase. In 20 years our own production has increased from 1,869,000 to 8,623,000, but the progress of the industry has lately been marked by severe fluctuations.

Free Cartage in Michigan.

The decision of the Supreme Court of the United States, in the Grand Rapids free cartage case, was reported in the *Railroad Gazette* of May 28, and was discussed when it was up before the Commission and the lower Court (May 9, 1890, page 324; Oct. 13, 1893, page 750). The full text of the present decision, now received, shows that the opinion of the Court is not by any means a sweeping approval, for application everywhere, of the practice of delivering goods to consignees free without regard to the injustice to other consignees which may thereby be done.

The essential facts in this case will be recalled: the Detroit, Grand Haven & Milwaukee, carrying freight from Eastern cities, charges the same rates to Ionia and to Grand Rapids, 33 miles west of Ionia, but at Grand Rapids delivers freight to consignees by wagon, without charge. This practice had been in existence 25 years or more, and long before there was a competing railroad at Grand Rapids (the other two roads now entering the city have their freight houses nearer the center of business than that of the Detroit, Grand Haven & Milwaukee). The Interstate Commerce Commission, on complaint from Ionia, held that the free cartage was essentially a rebate, thus making the rate to Grand Rapids substantially lower than to Ionia and therefore a violation of the long and short haul law. Commissioners Morrison and Schoonmaker said, in addition, that the free cartage was unwarrantable and illegal whether it discriminated against Ionia or not.

Justice Shiras, the writer of the present opinion, discusses the arguments both pro and con, but he seems to think that there is not a marked preponderance either way, and so the verdict comes pretty near being one of the "not proven" kind. The fact of at least a technical discrimination against the merchants of Ionia (as found by Messrs. Cooley, Morrison and Schoonmaker) is not denied, but the long existence of the practice and the lukewarmness of the complaint seem to be held to warrant the view that no harm will be done by letting the wrong-doer (the railroad) go free.

There is a statute of the state of Michigan (Laws of 1871, Section 3) specifically authorizing any railroad to deliver goods free within two miles of a station, but not forbidding discrimination in the practice. (This point has not been made prominent in the

* Statistics of the American and Foreign Iron Trades for 1896. Annual Statistical Report of the American Iron and Steel Association; containing complete statistics of the iron and steel and related industries of the United States for 1896 and preceding years; also a brief review of their present condition; also statistics of the iron and steel industries of foreign countries in recent years. Philadelphia: The American Iron and Steel Association, 261 South Fourth street.

decisions on the case by the lower courts.) Taking into consideration this law, and the absence of strenuous grievances, Justice Shiras narrows down the question to whether or not the long and short haul section of the law was violated, and, holding, as did the Circuit Court of Appeals, that the transportation with which the Federal law has to deal terminates at the freight house, he readily finds that the section was not violated. If transportation ended at the freight-house then the free cartage was essentially a rebate; but as a rebate made in that way appears to be lawful in Michigan, it seems to have been held that the federal government ought not to care anything about it.

Thus we have a decision from the highest Court but one, which, after all, settles nothing outside the state of Michigan. In the absence of a statute like that of Michigan, the practice at Grand Rapids must be one of two things: Either (1) the railroad service ends at the freight-house, thus making cartage service essentially a rebate, not specified in the tariff, which is illegal; or (2) the route of the freight wagon is equivalent to an extension of the railroad. In the latter case, the statement of the Grand Rapids rates in the tariff is deceptive, if not untruthful, for it does not truly state the distance for which goods are carried for the price named. For a railroad to run a freight wagon may not be repugnant to any statute, but if it is done at one town and the favor is denied at another it would be held unjust by any jury.

On the very same day that the Supreme Court issued this decision it issued another affirming the punishment of Mr. C. S. Wight, of the Baltimore & Ohio, for giving a cartage allowance to a consignee in Pittsburgh. The only essential difference in the two cases (except for the Michigan statute) was that at Pittsburgh the matter was kept secret and the discrimination was against another consignee in the same city. In Grand Rapids there was an aggrieved party in the same city, but it was not a consignee; it was a competing carrier, the Michigan Central. It is well understood, we believe, that that road was the instigator of this complaint. This, perhaps, accounts for the absence of desperation in the attitude of the ostensible complainants, Stone & Carten, of Ionia. It certainly weakens, from the practical point of view, if not from the legal, the claim that the defense is strengthened by the absence of any complaint from Grand Rapids merchants. This absence of complaints at Grand Rapids is one of the facts cited by the Supreme Court to sustain its decision.

In the absence of an express grant in its charter, what right has a railroad corporation to transport freight beyond its own chartered line? Commissioner Bragg, who dissented from Chairman Cooley's decision in 1890, filled 25 pages in an attempt to justify the practice at Grand Rapids, and he cited the example of the delivery of cars by railroad companies on private sidetracks; but the fact that a track has to be laid constitutes an important difference between such delivery and wagon transportation. The business of sending locomotives upon private sidings is at least of such a character as to be known to every one, and semi-public, like the other operations of a railroad. The Michigan Central had a charter to build a railroad into the heart of Grand Rapids and went to the expense of buying a right of way and constructing a railroad. The Detroit, Grand Haven & Milwaukee stops a mile out of town and practically extends its road into town by wagon, without a charter. From the Michigan Central point of view, this is a very real kind of discrimination. Commissioner Bragg said that if the free cartage had to be abandoned the defendant railroad would lose much of its business, and its rivals would enjoy a corresponding gain; but wherein is this unjust? What incentive can a road have to provide improved accommodations if it cannot enjoy the benefit of them after they are established? Judge Taft, who sustained the Interstate Commerce Commission (but who was overruled by the Circuit Court of Appeals), said "cartage is as foreign to ordinary freight business as would be the free packing of goods for shipment." This, it seems to us, is the common-sense view of the question for an American court to take, and whenever a case shall come before the Supreme Court uncomplicated by that absurd Michigan statute we shall expect to see it sustained.

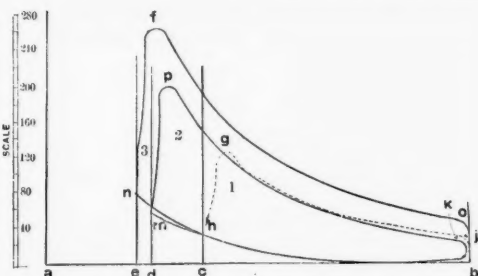
The prohibition of free cartage would compel the unfavorably located railroad to make its allowance in money, which, under the law, would have to be public; and that might not produce any improvement except through the process of a costly rate-war; but it would at least place the competition on a more rational basis, where all the elements could be understood and everything be above board.

The Economy of the Gas Engine.

At the last meeting of the Engineers' Society of Western Pennsylvania, Mr. R. T. Stewart considered the question of utilizing the rejected heat of gas engines. When we realize that from 70 to 80 per cent. of the heat supplied to a gas engine is discarded, the importance of the problem is readily appreciated. From a test on a Crossley Otto engine Mr. Stewart found that 7,400 British thermal units per indicated horse-power hour were not available. Figuring on the same basis a 100 H. P. engine would impart to the water jacket and to the escaping gases 720,000 British thermal units each hour, 46 per cent. of which would pass into the jacket water, the larger part of the remainder passing off with the exhaust gases, which in this case would have a temperature of not less than 1,700 deg. Fahr. The author of the article believes that a portion of this rejected heat could be made to perform useful work. In the first place he suggests an arrangement whereby about 68 per cent. (according to his figures) of the heat contained in the products of combustion could be used to generate steam for power purposes. He makes a calculation showing how this steam could be used in driving a steam engine and even suggests a "steam gas engine" with the cylinders arranged tandem, and the rejected heat of the gas engine the source of heat supply for the steam engine. This is an ingenious arrangement, but he does not consider the question of cost of installation or of the obstacles to be overcome, and we are led to believe that it is as impracticable as the proposed Wellington series engine. There seems to be no question but that the engineer should be able to save a large percentage of the rejected heat by using it in warming the feed water to the boilers, and that may be attempted as the gas engine develops its field of usefulness, but Mr. Stewart's plan appears to be a step in the wrong direction. The following considerations may indicate to the reader some of the reasons for believing that improvements must be made on the engine itself rather than attempting to run a steam engine by the discarded heat if the highest indicated efficiency is obtained.

There are two ways in particular in which the theoretical efficiency of the gas engine has been increased in the last 15 years. The first is by an increase of the range of temperature, while the second is by an increase of compression, and these are more or less dependent on each other. The efficiency of any engine cannot exceed the difference of the temperature of the working fluid as it enters the cylinder, and its temperature at exhaust divided by its temperature at admission, or by formula this is expressed thus: $E = \frac{T - T^1}{T}$ where the temperatures are reckoned from absolute zero (460.66 deg. below 0 deg. Fahr.). This formula is also true if T and T^1 represent actual heat units. Thus it will be seen that before the engineer can secure a high efficiency he must obtain a large range of temperature between the admission and the exhaust gases, so that any attempted improvement in the gas engine that prevents the lowering of temperature before exhaust raises the back pressure of the exhaust gases and thus the engine will not do as much work, and consequently the efficiency will be diminished. Would it not, therefore, prove more economical to secure a long range of temperature and a low pressure at exhaust, than to complicate machinery and reduce the possible efficiency of the gas engine?

As already mentioned, another way to increase the efficiency is by increasing the compression. According to data contained in a paper recently presented before the Institution of Civil Engineers, by Mr. Dugald Clerk, the Crossley Otto engine gave an indicated efficiency in 1882 of 16 per cent., with a compression above atmosphere of 38 lbs. per square inch. In 1888 19 per cent. was attained, with a compression of 66.6 lbs., and in 1894 the compression was raised to 88.5 lbs., with an efficiency of 25 per cent. The theoretical efficiency during these three periods was about 34, 39 and 43 per cent. respectively. This will be shown more



Diagrams Showing Effect of Increased Compression.

clearly by the accompanying diagram, which represents the cards from these three engines plotted on the same scales of pressure and volumes. ab represents the total volume of the cylinder, including the compression space. At the end of the compression stroke the volume of gases would be compressed to the volumes ac , ad and ae , respectively, in the engines built in 1882, 1888 and 1894; the corresponding compression pressure ch , dm and en being 38, 67 and 88 lbs. respectively. The absolute indicated efficiency was, as stated, 16, 19 and 25. It is evident that card 2 is larger in area than card 1, and that card 3 is considerably larger than card 2, but a little more gas was used in this last case than in the others. It will be

understood that this increase in area represents an actual increase of work, and this is accomplished chiefly by means of the increase of compression.

Mr. Clerk has for a long time contended that no advantage has been gained in the Otto or any other gas engine by retaining the products of combustion in the compression space. These products should be discharged and the space filled with the combustible mixture, or with pure air, providing the latter can be done without mechanical complications, and he believes that the economy obtained by the Crossley Otto "scavaging" engine is due in a large measure to carrying this "combustion product" theory into practice. The above theoretical considerations are but steps toward the ideal condition as expressed by the Carnot cycle. Other questions, such as lubrication, the practical limit of compression, the proper strength and weight of the parts, the correct volume of the cylinder for a certain indicated horse-power and considerations equally important, confront the engineer who knows in what direction improvements must be made, but at the same time realizes that every step in the further improvement of the gas engine must be taken along conservative lines, and even then not until it has received that careful study which is essential to the success of new and important engineering problems. It might be well to state, in this connection, that some engineers of high standing believe that the immediate future development of the gas engine must be mechanical, not thermo-dynamic. Whether this belief is shared generally among those who have given the subject careful study we are unable to say. It must not be inferred from what we have said above, however, that the gas engine is comparatively an inefficient machine: on the contrary, the actual indicated efficiency of the improved Crossley engine is greater than that of the best quadruple expansion steam engine, and it will be remembered that the efficiency of the steam engine is calculated as if it were a separate machine and does not include the boiler efficiency, which would reduce this figure to say 17 per cent. when starting with the heat in the coal as a basis.

Another suggestion of Mr. Stewart's is to use the discarded heat for warming buildings, drying, cooking, etc. This suggestion seems feasible, and according to his figures it would be possible to abstract about 82 per cent. of the heat ordinarily rejected in the exhaust gases under favorable conditions. He suggests the following arrangement: The main return from the hot-water heating system is connected to the engine at or near the bottom of the water jacket. The top of the water jacket is connected directly to a heater, through which the exhaust from the engine is made to pass, the heater being connected with the main flow-pipe of the hot-water heating system. The water from the main return of the heating system, entering the engine jacket at say 100 deg. Fahr., would leave at a temperature of say 135 deg., carrying with it the heat ordinarily rejected to the water jacket. It would then enter the heater at a temperature of 135 deg. and leave at say 165 deg., having reduced the temperature of the exhaust gases to say 300 deg. This, of course, would necessitate the rapid circulation which is very desirable in most hot-water heating systems. These and other suggestions might be adopted, but the question of the efficiency and economy of the entire plant would of necessity be a matter of actual experiment. It must be left to the engineer to say whether it is advisable to use the wasted heat of either a steam or gas engine in any particular case, as hardly two conditions are the same, and a loss in one place might prove a gain in another.

The Chicago street railroads have got from the Illinois Legislature about what they wanted after all; at least they have got a law which will probably prove to be liberal. The "Humphreys bill," which extended the franchises of the street railroads in Chicago for 50 years and gave them valuable privileges without assurance of adequate return to the public, was defeated in the lower house of the Illinois Legislature about a month ago, but a new measure, known as the Allen bill, which is a modified Humphreys bill, has become a law, having received the signature of Governor Tanner. While concessions have been made to the demands of the public as expressed in the Chicago mass meetings, especially in reference to the rights of an individual property owner to enjoin the building of a street railroad, yet the measure will have the effect of strengthening the existing railroad companies without giving to the city the desired control over their doings, and apparently it will prevent the city government from regulating the terms of franchises for the next 20 years. The main features of the law, as they apply to Chicago, are reported as follows by the newspapers: Existing street railroad franchises are extended for 35 years from Sept. 1, 1897; for 20 years the companies are allowed to charge 5 cents for a single fare and for the remaining 15 years the city authorities can fix the fare; the companies must pay to the city 3 per cent. of their gross receipts during the first 15 years, 5 per cent. for the next 10 years and 7 per cent. during the remaining 10 years; a street railroad commission is to be created consisting of the Mayor, the City Attorney and the City Clerk; all franchises for new lines or extensions are to be sold by the City Treasurer at public auction to the highest bidder. The City Council may extend franchises, apparently, for 50 years. The Chicago papers are loudly denouncing the legislature and the Governor, asserting

that thousands of dollars have been spent to secure the passage of the bill. The essential vice of the bill is that it fixes rates of fares and of taxes too far into the future, and too arbitrarily for companies differently situated. The Chicago City Council, according to all reports, is weak enough and corrupt enough to perpetrate any possible blunder or injustice, so that both the public and the railroads may be no worse off when matters are regulated in detail, as in this case, by a law passed by the state legislature, than if the municipality acted independently in fixing the taxes and the terms of the franchises of its street railroads; but this law, while leaving "boodles" aldermen free to grant liberal franchises for long terms, makes limitations such that if the city should ever elect an honest board, and it were found desirable to revise the contracts with the railroads, the board would find its hands tied. On the other hand, the value to the railroads of the assurance of a certain rate of fare for a term of years is clouded by the possibility of the establishment of competing lines. The only commendable feature of the bill is the provision for free and public competition in bidding for new franchises.

The Webb & Thompson electric train staff is now in use on the Cincinnati, New Orleans & Texas Pacific, the line over the bridge across the Ohio River at Cincinnati having been operated in this way for about two months. The form of staff used is that which separates in the middle, and the rules require that one half of the staff shall be given to the engineman and the other half to the conductor. There is a permissive attachment, and the permissive staff is used whenever necessary, though never for passenger trains. When two or more trains are allowed to follow one another through the block section the operator gives to the engineman of the last train all the unused tablets, chained together, and to the conductor he gives the staff. Conductors and enginemen are forbidden to transfer a staff or tablet to another train, being required in every case to deliver them to the operator, who must pass them through the instrument, according to the rules, before delivering them to another train. There is a rule permitting the use of the main track by switching engines, near the signal cabins, at both ends of the block, without the staff, the signalman taking care that no staff has been withdrawn at the other end of the block. In case the staff instrument gets out of order the operators may communicate with one another by telegraph, and send trains forward with written orders to run under control.

Receiver Felton, of the Cincinnati, New Orleans & Texas Pacific, has issued orders that conductors of passenger trains, when approaching meeting points, must signal the engineman by the air whistle — — — to notify him that the train is approaching a meeting point; and also that where the train having the right to hold the main track reaches a meeting point first, the conductor and engineman must at once set the switch for the sidetrack, so that the other train can clear the main track with the least possible delay. At American Falls, Idaho, on May 27, there was a disastrous collision (wrecking two engines, 20 freight cars and the station building, and killing five tramps) which, presumably, might have been prevented or greatly mitigated if the second of these rules had been in force. A westbound passenger train standing at the station was run into by an east-bound freight, which had become uncontrollable on a descending grade in consequence of the closing of the train-pipe air-cock just back of the tender. No passengers were killed, but probably every person on the train would warmly advocate, for the future, a rule throwing freight trains on the sidetrack in every such case—whatever the result to the sidetrack or to the freight. The orders above mentioned are numbered 93a and 93b and constitute a supplement to the rules which were noticed in the *Railroad Gazette* of May 28. In connection with that notice we have received a communication from a correspondent which seems to indicate that our remarks concerning the clauses which Mr. Felton omitted (in copying from the code prepared by the American Railway Association Committee) were looked upon as in every case criticisms. Such is not the case. In referring to rule 609 we called attention to what we deemed a mistake, but substantially the whole of the notes in our article on page 365, concerning Rules from No. 1 to No. 1,414, are bare statements of fact, uncolored by opinion, either adverse or commendatory.

Some of our readers may be aware that beer is brewed in Bavaria—and unfortunate is the man who does not know it. The stories told of the amounts consumed there would indicate, however, that not much of the national brew could be spared to go out of the country. But the statistics of the traffic show that in 1895, 408,929 metric tons of beer were shipped (by rail) from the Bavarian breweries, of which only 86,771 tons went to Bavarian stations, while 282,011 tons went to other countries in Germany, and 40,147 tons to other European countries, France taking 11,439 tons, Switzerland 10,421, little Belgium—itsself a great brewer—5,128, and Italy 2,309 tons. In most European countries the traveler sees on the sidings the large white cars of the great Munich breweries. Berlin alone took more than 26,000 tons in 1895, and the traffic grows steadily. A great similar traffic has reached enormous proportions in this country, where beer is carried in carloads across the continent, and to the remotest villages in the South and the Rocky Mountains, notwithstanding the fact that there are breweries

almost everywhere. The Bavarian State Railroads and the Bavarian breweries together have about 1,300 special beer cars. One brewery in Munich owns 150 beer cars; others 126, 90, 88 and 74 respectively. The brewers are not allowed anything by the railroads for the use of these cars, but the railroads clean and maintain them, including the refrigerating apparatus. The car owner is required to furnish traffic enough for 2,500 km. (1,550 miles) run per month for each car; otherwise a charge of 3 marks per day may be made for yardage. Several beer trains leave Munich daily, and the traffic yields a material part of the earnings of the Bavarian railroads.

Speonk appears to be one of the burning issues on Long Island at present. We refer not to the village, but to its name, the Long Island Railroad having recently announced that the names of five stations, including Speonk, will be changed in order to make them correspond with the post-office names. This order has been made, it appears, in consequence of the vacillating tastes of the residents along the line of the road, some of them applying to the General Manager every few days to have their stations rechristened. In the case of Speonk the diversity of taste is, of course, a thing to be expected. Any lover of historical accuracy or of the local "flavor" which makes one place better than another to live in, or any native who believes in preserving his forefathers' landmarks must, of course, prefer Speonk. On the other hand, it is not surprising to find the partisans of the new name, Remsenburg, persistent in pushing their view. "Remsenburg" is not half so poetic as it might be; but it is a change, and the word is sufficiently common-place to satisfy the end-of-the-century person. We hope, however, that the advocates of Speonk will persevere, and either win or die. They should take courage from the fact that the citizens of Cos Cob triumphed over all the hordes of New York city innovators who tried to wipe out their good name, and are now living in peace and happiness.

NEW PUBLICATIONS.

Railway Technical Vocabulary. French, English and American Terms. By Lucien Serraillier. Pp. 222, 12 mo. London: Whittaker & Co. New York: The Macmillan Co. Price \$3, or 7s. 6d.

It has been M. Serraillier's aim to collect an international nomenclature, giving the technical equivalents in each language; but he has confined himself to French and English terms, and where the American usage differs from the English the American term is also given and marked with a star. The words and phrases are arranged in parallel columns, which arrangement begins on the title page and is carried through the dedication, the preface, the table of contents and the entire vocabulary; as, for example, we are informed that the author owes his

Sincères remerciements à M. W. F. Allen, Secrétaire de l'American Railway Association, etc.

Thanks to Mr. W. F. Allen, Secretary of the American Railway Association, etc.

Naturally a glossary made up of phrases rather than single words could not readily be made alphabetical even in one language; and it could not possibly be alphabetical in both, without duplication. The author has, therefore, made it possible to find terms by classifying them. Thus we have the groups of terms belonging to the department of Administration of Traffic of Way and Works, etc., etc., and a pretty minute sub-classification is made under each of these groups. So, by judicious use of the table of contents, one can find the term that he wants, if it is in the book, and the chances are that it is.

Every English-speaking man who has tried to read French railroad literature, in any department, must have felt the need of this vocabulary. The best dictionary will help him little, and, indeed, will often mislead him. M. Serraillier's book is accurate enough and complete enough to serve the purposes of most readers of this class of literature, or at least to help them very materially, but it is neither strictly accurate nor very complete. It is an intelligent approximation, and indeed it is the only attempt at an international vocabulary of railroad terms that we have ever seen.

TRADE CATALOGUES.

The Pneumatic Engineering Co., of 100 Broadway, New York, has sent us a copy of the second edition of the catalogue issued by the water pumping department of that company. The "air-lift" method of raising water to considerable heights is very carefully described. An especial feature of this method lies in the fact that any number of wells distributed over a wide territory may be operated by one plant and by one force of men. On page 8 the details of the construction of the air shafts are shown, from which one can become familiar with the general principle of the air lift, and on page 10 is an illustrated description giving the manner of testing wells. Only approximate prices are quoted in the catalogue, inasmuch as the conditions vary in each case, and it is necessary to know certain quantities very definitely in order to make an accurate estimate. The engravings throughout are carefully executed, while the reading matter contains much valuable information, making this pamphlet 20 pages of real value, as well as very attractive.

Rubber Mats, Mattings and Treads.—The Boston Belting Co., of 256 Devonshire street, Boston, sends us a

20-page 6 x 9 in. catalogue, in which the perforated rubber mats and other rubber goods made by that company are presented by carefully executed engravings and a few words of explanation to purchasers. A complete price list is given for the mass of different designs, some of which are intended especially for railroad stations and cars.

The M. C. B. Convention.

(Continued from page 439.)

Mr. WAITT moved that the report of the committee be adopted. Carried.

Topical discussions were then taken up. No. 11. Is there any advantage in the use of M. C. B. Air-Brake Defect Cards?

Mr. FILES: My own observation and experience leads me to think they are of advantage, for the following reasons: First, if a car is delivered by a connecting line and is placed in a train and is found after it has been tested to have defective air-brake apparatus the inspector or conductor immediately applies the card showing whether it can be placed between air-brake cars or not. Then when it arrives at a terminal point and the train is broken up, the yardmaster knows without any testing of the brake just where he can place the car, thereby saving the cost of a probable extra switch. Again, the defect may be such that it could be readily repaired at some of the inspection points without delay, owing to the repairman not having to test the air in order to find the defect. However, in order to procure the best results from the defect card, it should be allowed to remain on the car until the defect for which the card was applied had been repaired and not removed by the road applying the card when the car leaves its line, as is done by some roads. By allowing them to remain, each road would receive the benefit of the inspection of the other road. I think there could be improvement made in the present M. C. B. air-brake defect card by designing one showing the main defects and numbering them and leaving a couple of blank spaces for writing in the defects not already covered. In that manner a very much larger number of defects could be covered by the card than would be possible otherwise or by the use of the present card. Such a card is at present used by the road I represent and is found to be far ahead of the present one. I would like to see it used by all roads and used as I have stated.

Mr. RHODES: We lose sight of the object of the air-brake card if we imagine that it is going to give us the real cause of the defect. The great thing to know is that the car itself is out of order; and the principal thing is to know if the defect is of such a nature that it will allow of its being coupled up with other cars, or whether it must be put on the end of the train. If there is no air-brake defect card at all, then you have a car breeding trouble wherever it goes.

Mr. WAITT: Many times cars are placed on repair tracks with an air-brake card on them, but no indication at all as to what the difficulty is. On the Lake Shore we find a great deal of help in adding to the present air-brake card some dozen or so of the principal classes of defects.

Mr. MORRIS: About a year and a half ago we started the use of air-brake defect cards. We have a very mountainous country and we find it a great help to our inspectors to designate certain cars as being out of order as to the air-brake.

No. 12.—Is it a safe and advisable practice to splice air-brake hose, and should such hose be condemned in interchange?

Mr. RHODES: I am going to take the affirmative on this question. It ought not to be condemned, except under the conditions that a plain hose would be condemned. To splice the hose it is cut in two, the damaged parts removed and the union pushed in; the union costs 7½ cents. A new hose costs 75 cents. When we started nearly two years ago to splice hose on the C. B. & Q. we at once saved the purchase at one shop of 200 hose a month. Had we bought new hose it would have cost \$150 a month, or \$1,800 a year, which at five per cent. is the interest on \$36,000.

We realized when we started in that at inspection points it would cause trouble, and, therefore, the first spliced hose was used on passenger cars. We then applied the spliced hose to tanks and to stock cars which do not leave our line, and then to the coal cars which do not travel about very much. Now some of them are on our box cars. We have had no trouble whatever in the use of the spliced hose.

Mr. BARR: We have practised this method for over a year. We put them on any car we desire. There were a number of roads objected, but after a little correspondence they all, with one exception, said that so far as they were concerned they were satisfied, if the hose was in good condition, to accept it.

Mr. WAITT: I move that it is the sense of this meeting that the splicing of hose, where all badly worn parts are removed, is a proper and safe practice.

Mr. GARSTANG: Is the union made of cast or malleable iron?

Mr. RHODES: We started to make the nipple of cast iron, but found it made it a little heavy, and we now make them of malleable iron.

Mr. SANDERSON: Is the size of the hole through the union the same as the size of the hose; would it interfere with the action of the brake?

Mr. RHODES: It is the same size as the hose.

Mr. WAITT's motion was carried.

Topic No. 13. "Would it be advantageous to adopt an M. C. B. Coupler Defect Card, to be applied whenever couplers become uncoupled in service without apparent cause?"

Mr. MCKENZIE: On our line we have a conductor's report of any defects to M. C. B. couplers, or any other couplers or drawbars. The principal thing we are after is to learn the cause of the uncoupling while in motion. I do not believe a card is as advantageous as a report. These daily reports come to my office, and at the end of the month a report is compiled which is submitted to the general superintendent. We are in this way learning something about the value of the different couplers and uncoupling devices, and defects connected with the M. C. B. drawbar.

Mr. RHODES: I advocate an M. C. B. coupler defect card. There are many cars running about with defective couplers, which no one knows anything about, and

which are not reported, so long as they will take the cars over the division. A card could be tacked on to the end of the car, and I have one which we propose to introduce on the C., B. & Q.

Mr. MILLER: I do not believe in too many defect cards. The reasons given in the case of the air-brake card were excellent. Our conductors and Division Superintendents are obliged to make careful reports of all uncoupling, and we send those reports to the mechanical department.

Mr. McKENZIE: Ninety per cent. of all our break-in-tuos have been in pulling out of the station.

No. 14.—Air-brake hose specifications. Is a heavy four-ply hose better than a two or three-ply hose of equal diameter, but having greater pliability?

Mr. WAITT: I have been trying lately to get a collection of specifications from different roads on the subject of air-brake hose. I find that very few roads have gone into the matter at all in detail. It is surprising how good material and how poor material is sold under the same guarantee by different makers at different prices. Some time ago a gentleman brought a sample of hose to my office to look at; a two-ply hose, which was a revelation. I thought that the regulation four-ply hose must necessarily be used. I found in the two-ply hose we got a very flexible hose with a good thick layer of rubber between the two layers of the webbing or duck, and a very strong friction between them, so that you could not tear the rubber and duck apart without an unusually heavy pull. I also found that the two-ply hose will stand a pressure before bursting of something over 900 lbs. I found also that some of the four-ply hose in the market will not stand anywhere near that. This has opened up a new question, and I have been experimenting a little on the comparative advantages of these different styles of hose.

I find a simple way is to take a section $\frac{3}{4}$ in. long out of the hose. Then take a miter box and a saw and grind off the teeth and sharpen the edge. Then you carefully find where the canvas ends at the top and cut through, strip it, cut a hole in it, and take an ordinary spring balance and hook in the hole so cut, and pull open the canvas; you will find what the friction is. As it is this one pulls apart at 6 lbs. and is not worth using. It is composed of adulterated rubber and very fine duck, and furthermore has only a thin layer of rubber between the canvas. I have a three-ply section here, which has a thick layer of rubber between, and it takes 16-lbs. pull separate the $\frac{3}{4}$ -in. section. Here is one with two ply which takes 16 lbs. to pull it apart. When you get down to the bottom of the layers of rubber, stripping it apart, you are supposed to have a tube of 95 to 97 per cent. pure rubber. This one (indicating) cannot have much over 80 per cent. Instead of being elastic, so that you can get a great amount of stretching from it, you can pull it apart like punk. In this one (indicating), as I have found in a number of samples of hose, the tube is joined only about one-half of its thickness through. The other part is not joined, and you only get half the thickness of the tube to give you any benefit. I cannot enlarge on all the points connected with the subject, but speak of these only to show the necessity for some study on the part of the members of the association and possibly on the part of a special committee on the subject of air-brake hose and proper specifications for them.

Mr. BARR: I heartily indorse what Mr. Waitt has said. I do not believe in getting this hose to stand 800 or 900 lbs., when you want to apply it to an air pressure of 65 or 70 lbs. March, a year ago, I got some water hose, cotton on the outside and the rubber tube on the inside, and put it on a passenger train making as many stops as any train on the road, and it is running there all right to-day. The question has been raised if it would not be safe to use two ply hose? I am of opinion that it would.

Mr. CARSON: I find the hose that stands best in service is the hose that pulled best with the pulling test; and, furthermore, in order to determine the best quality of gum, we used a small piece of the rubber cut out and by pulling that to twice its original length and allowing it to return again to its original length, if there is no permanent set to it, it was a good quality of rubber. The hose which stood the best hydraulic test did not by any means stand the best tests of other kinds, neither were they the best quality of hose in service.

No. 15. Is the 24-months' guarantee on air-brake hose of any practical advantage?

Mr. BOWEN: It is necessary to rely largely on the manufacturer, and many times in the close competition of to-day low price gets ahead of quality. From the standpoint of an individual car-owner it is my opinion that a 24-months' guarantee is practically valueless. Air-brake hose on individual cars is removed almost entirely by railroad companies, and as manufacturers mostly recognize in renewals of air-brake hose only the companies whose names are on the hose, the guarantee on such material is lost unless some system could be established for the purpose of making use of the guarantee. The number removed by the individual car-owner is so small, and of those removed the percentage which manufacturers allow they are responsible for is so low, that the guarantee is practically of no value.

Mr. RHODES: The guarantee draws attention to why so many hose fail. We saved at one time 600 hose that had apparently failed in their guarantee. The manufacturer went over them with me, and out of the 600 we set aside five hose, which the manufacturer admitted he was responsible for. That showed clearly there was no use in the guarantee? No; it showed me we were putting on the hose wrong, and in such way that it wore itself out. The angle cocks were put on improperly; they came in contact with the drawbars. The investigation brought up things showing that the manufacturer was perfectly warranted in not replacing those hose worn out on account of the careless way they were applied.

No. 18.—What, if any, are the advantages in having journal boxes with round bottom instead of square?

Mr. BUSH: The principal advantages of round journal boxes are: 1, they are lighter; 2, stronger; 3, they reduce the amount of waste or packing about one-fifth or one-sixth.

Mr. WAITT: Is it not true also that with the jarring incident to the service the waste does not tend to settle away from the center?

Mr. BUSH: That may be true to some extent, but we have no facts on which to make a statement of that kind.

Mr. WAITT: I have always been impressed with the practicability of the design adopted by the Pennsylvania Railroad, and am experimenting with it; we have found that the malleable iron people have patterns, that they will furnish everything to M. C. B. standard, merely using the rounding section of the box, so that it is a matter which will probably be open for anybody to try as they can buy the boxes as cheaply as the common style.

No. 20.—Is it desirable to have a uniform system of indicating on defect and repair cards the exact location of defects? If so, what is the simplest way of accomplishing the desired result?

Mr. BALL: I should say that it is very desirable to have the location of defects indicated on repair and defect cards, and that it should be done in uniform manner on all roads, for the following reasons: The main object of the use of the M. C. B. repair card is to protect the owner when improper repairs are made, by locating the road responsible for making the improper repairs. By locating defects carded or repaired on defect or repair cards the clerks making bills can tell at a glance what the proper labor charge should be in those cases where two different charges are specified by the Rules for renewing the same parts when in different locations. The same thing applies to the checking of bills received.

Also in connection with the application of brasses to foreign cars, where two or more have been applied to the same journal by one road, the repair card should show to what journal the brasses have been applied, and a check on bills for such work is had, as well as furnishing correct information in making bills, the Arbitration Committee having decided that but one brass in such cases can be charged for.

To show the location of defects in the simplest way, the ends of all cars should have stenciled thereon the letters "A" and "B" in $1\frac{1}{2}$ in. letters, the letter "B" for the sake of uniformity to be stenciled on the vertical brake-shaft end and the letter "A" on the opposite end. The location of each part repaired should be shown separately, the letter or letters indicating the location to follow each item on the repair card and stubs. Also on defect cards and stubs, the location of each defect to be shown by having the location letters follow such defect.

Where the location of a part cannot be definitely indicated by the single letter "A" or "B," on account of duplicate parts, one on each side of center of car, the letters "R" and "L" should be used in addition to the letter locating the end, according to whether the part is located on the right or left side of the end from which the location is based, the determining of right or left to be made from the side when standing facing the end of car. In addition to the end letters "A" or "B" and "R" or "L," where more than one detail of the same name exists, numbers should be used. In discussing this subject with representatives of the roads, objection has been made to the effect that the carrying out of this system would require more of the inspectors' time. But the result of our experience of over four months shows that no additional time is required.

Mr. WAITT: I move that this subject be referred to a committee for further consideration and report next year. Carried.

Report of the Committee on Subjects for 1898.

1. Injury to track and trucks from salt-water drippings from refrigerator cars and best method for its prevention.
2. Train parting (continued).
3. On the improvement and perfection of the top-hinge lid, that it may completely exclude dust from journal boxes.
4. On the modification of the standard journal boxes, to adapt them for use in trucks (whether for passenger or freight cars) involving the use of pedestals.
5. To consider the question of defining the length and spread of the guard arm of the automatic coupler.
6. To consider (jointly with a committee of the Master Mechanics' Association) whether the standards of the associations in the matter of square bolt heads and nuts ought in any way to be modified.
7. Air brake hose specifications. To consider the prevailing conditions connected with the manufacture and use of air hose and the necessary requirements to insure hose being properly made.
8. Standard coil springs for freight car trucks.
9. To consider the practicability of establishing test bureaus for railway companies.
10. The value of thermal tests for car wheels and how they should be conducted.
11. To consider the best method for packing and care of journal boxes.
12. Joint Committee of M. C. B. Assn., Am. Ry. Assn., and Am. M. M. Assn. to further consider the revision of air brake and signal instructions.
13. Committee to further consider and report designs for steel framing for freight cars and to obtain criticisms on designs furnished by Joint Committee of 1897.
14. Is it desirable to have a uniform system of indicating on defect and repair cards the exact location of defects? If so what is the simplest way of accomplishing the desired result? Your committee would call the attention of the members to the fact that with many subjects the burden of work necessarily falls on the chairmen of the committees, and as some of the topics can be readily made the subject of individual papers, we would recommend that the Executive Committee consider the advisability of assigning some of the subjects each year for individual investigation and paper on the results of such investigation.

Mr. WAITT moved the report be received. Carried.

Resolutions.

Your committee recommends the adoption of the following resolution, in recognition of the courtesy and hospitality of those who have contributed to the success and pleasure of the Thirty-first Annual Convention of the Master Car Builders' Association:

Resolved, That the cordial thanks of the association be tendered to Col. Royal T. Frank and other officers of the United States military forces at Fortress Monroe for numerous courtesies; to the Commander and officers of the United States Battleship Texas for the opportunity afforded our members to visit and inspect that

magnificent warship; to the Hon. Charles T. O'Ferrall, Governor of the State of Virginia, for his eloquent address of welcome; to the Chesapeake & Ohio Railroad Company for numerous courtesies and privileges, and particularly to its representative, Mr. W. S. Morris, for his indefatigable efforts for the convenience and comfort of members in attendance; to the Pullman and Wagner Palace Car Companies, the Norfolk & Western Railroad Company, the Norfolk, Virginia Beach & Southern Railway Company, the Norfolk & Ocean View Railway Company, the Old Dominion Steamship Company and the Merchants' and Miners' Steamship Company for valued transportation facilities; to the proprietors of the Chamberlain and Hygeia hotels for the ample and comfortable accommodations provided; to the managers of the Hampton Normal and Agricultural Institute for the opportunity of visiting that useful and interesting institution; to the *Railway Age* for the publication of reports of our proceedings in the daily issues of that periodical; to the various committees of the Supplymen's Association for the liberal entertainment provided for the ladies of our party and ourselves; and, finally, to the officers of our association for their able and progressive management of its affairs.

Mr. ADAMS moved its adoption by a rising vote. Carried.

On call for a speech by Mr. Crone, the newly re-elected President, he said: In again conferring upon me the office of President you have bestowed an honor which is fully appreciated; but I am painfully sensible of my inability to adequately discharge the obligations imposed. Relying upon your forbearance and that generous spirit of co-operation and earnest support characteristic of our membership, I accept the presidency for the ensuing year, and pledge to you my renewed efforts in promoting the purpose of this organization.

Mr. Chamberlain, re-elected First Vice-President: "I do not know that I can say anything more than I did last year—'Me too.'"

On motion of Mr. Waitt, adjourned.

Exhibits at the Old Point Conventions.

The following exhibits were not in place at the time of going to press last week:

- Ajax Metal Co., Philadelphia, Pa.—Samples of Ajax cellulose, a substitute for cotton and woolen waste.
- American Balance Slide Valve Co., Jersey Shore, Pa.—Models of the American balance slide valve.
- American Brake Beam Co., Chicago, Ill.—Kewaunee brake beams for passenger and freight cars.
- Asbestos Paper Co., Boston, Mass.—Samples of "air-cell" asbestos lagging and sectional covering.
- Babcock Fire-Trimmer Co., Johnsonburg, Pa.—Model of a new patent tire-trimmer for trimming locomotive and car wheels.
- Baker Forge Co., Elwood City, Pa.—The company is furnishing all the body and truck forgings for the 600 steel cars now being built by the Schoen Pressed Steel Co., of Pittsburgh, Pa. Two of these cars were exhibited at the convention.
- F. W. Bird & Son, East Walpole, Mass.—Samples of the "Neponset" insulating paper. A model of a car roof was shown to illustrate the method of application as a roof lining for refrigerator cars.
- The D. W. Bosley Co., Chicago, Ill.—Samples of Bosley's metallic weather strip.
- J. G. Brill Co., Philadelphia, Pa.—Model of the Brill No. 27 truck for passenger cars.
- Chouteau pneumatic hammers, pneumatic drills, and metallic packing for Westinghouse pumps.
- S. F. Cummings, Del Rio, Tex.—Models in wood, of a patent ash pan for locomotives.
- Chesapeake & Ohio Ry.—Standard hopper car with wooden underframe, built by the Ensign Mfg. Co., Huntington, W. Va. This car was placed on the same track with the metal hopper cars of the Norfolk & Western and Norfolk & Southern so that a ready comparison could easily be made of the two types of construction. Also, Air Brake Instruction Car.
- Coale Muffler & Safety Valve Co., Baltimore, Md.—Samples of Muffler Safety Pop Valves.
- Detroit Lubricator Co., Detroit, Mich.—A full sized improved Detroit lubricator for locomotives.
- W. Dewees Wood Co., McKeesport, Pa.—Samples of patent planished sheet iron.
- Donnell, Field & Co., Oley, Ia.—A full size auxiliary bar M. C. B. car coupler.
- Erie Malleable Iron Co., Erie, Pa.—Two full size Erie M. C. B. car couplers.
- D. H. Frater, Upper Sandusky, O.—Model of the Clark center draft automatic car coupler.
- Franklin Steel Casting Co., Franklin, Pa.—A full size "Lone Star" automatic M. C. B. car coupler.
- General Electric Co., Schenectady, N. Y.—A model, in wood of the third rail electric system as applied to the Nantasket Beach and Hartford, New Britain, and Berlin branches of the New York, New Haven & Hartford Railroad.
- Hale & Kilburn Mfg. Co., Philadelphia, Pa.—A full size "Walkover" car seat, with movable foot rest and oval pedestal base and the "reversible" car seat with new base and foot rest.
- Hewitt Mfg. Co., Chicago, Ill.—Model of the Hewitt rolled steel car truck.
- J. R. Hosier, Hampton, Va.—A model in wood of an axle lubricator, patented by Mr. Hosier.
- Jenkins Bros., 71 John St., New York City.—A number of Jenkins brass and iron body globe, angle and gate valves, Y or blow-off valves, a Sellers' restarting injector, the Jenkins "Diamond" trap and samples of different sizes of Jenkins valve discs, union rings, pump valves and packing.
- Joyce, Cridland & Co., Dayton, O.—Models of and full size geared lever jacks.
- Main Belting Co., Philadelphia, Pa.—Samples of the Leviathan belting and waterproof belt dressing. One of the rolls of belting was 30 in. wide and eight ply thick.
- Mason Regulator Co., Boston, Mass.—The Mason hydraulic damper regulator, reducing valves, air brake pump regulator, pump governor and a model of the Mason improved steam pump.
- McConway & Torley Co., Pittsburgh, Pa.—A full size Janney coupler, with new locking attachment.
- J. D. McIlwain & Co., Allegheny, Pa.—Samples of the "Sure Grip" wrought steel hose clamp.
- Robert McVicar, Chicago, Ill.—A number of patent locomotive cars.
- Missouri Malleable Iron Co., St. Louis, Mo.—A line of refined malleable castings for railroad uses.
- New York Car Wheel Works, Buffalo, N. Y.—Samples of car wheels and axles. The company also furnished its "J. M. Special" wheels for the steel cars for the Pittsburg, Bessemer & Lake Erie Railroad, exhibited at the convention.
- Niles Tool Works Co., Hamilton, O.—A sample all-wrought steel pulley, made by the American Pulley Co.
- Norfolk & Southern R. R. Standard flat car with metal underframe. The weight of the car is 20,250 lbs. and the capacity is 60,000 lbs. The underframe is wholly of steel channels which form the side, intermediate, center and end sills. This car was put in service in November, 1892, was repainted November, 1894, and no repairs to the underframe have been made since the car was built.
- Norfolk & Western Railway.—Hopper car, of 60,000 lbs. capacity, with metal underframe, built January, 1896, and placed in service February, 1896. The light weight is 29,200 lbs., and a similar wooden underframe car would weigh 27,100 lbs. The frame is made up of steel channels, weighing 24,500 lbs. This car was built in May, 1896, and put in service the following month. The light weight is 24,500 lbs., and a similar wooden car would

weigh 20,400 lbs. This car is constructed of steel channels forming a box, which makes the central "back-bone" of the frame, and differs in this regard from the ordinary center-sill construction. The side and end sills are steel channels. During a test with a distributed load of 100,000 lbs., the center sills deflected $\frac{1}{8}$ in. and the side sills $\frac{5}{16}$ in., but there was no permanent set.

Pratt & Letchworth, Buffalo, N. Y.—A very complete line of malleable and steel castings for railroad purposes, and a full-size Pooley car coupler. The company also showed a cast-steel driving wheel center, similar to some furnished the Brooks Locomotive Works for a series of tests.

Pyle National Electric Headlight Co., Chicago, Ill.—A full-size Pyle National electric headlight for locomotives.

Richmond Locomotive Works, Richmond, Pa.—Ten-wheel simple locomotive, built for the Charleston & Western Carolina Ry., and a consolidation compound locomotive built for the Chesapeake & Ohio Ry.

Also, the compound cylinders and saddle casting originally used on the Richmond "Tramp" compound, attached to a section of a front end showing exhaust apparatus. The intercepting valve is also cut away to show the manner of working.

Rochester Automatic Lubricator Co., Rochester, N. Y.—Eight sizes of the Rochester automatic lubricator.

Joseph T. Ryerson & Son, Chicago, Ill.—Specimens of the "Ulster Special" staybolt iron.

Safety Car Coupling Co., Philadelphia, Pa.—The safety car coupling knuckle.

Safety Car Heating & Lighting Co., New York.—The only exhibit made by this well-known company is a government buoy lighted with the Pusch gas.

Securit Furniture Co., St. Louis, Mo.—A number of large photographs showing different styles of car seats made by the company.

H. J. Schmick, Hamburg, Pa.—Models of the Schmick flush freight car door, and combined freight and dumping car.

Sherry Torch Co., Rochester, N. Y.—A No. 10 Sherry kerosene oil torch of 2,000 c. p.

E. T. Silvius & Co., Indianapolis, Ind.—Model in wood of Pound's improved journal box for locomotive trucks.

Standard Coupler Co., 26 Cortlandt street, New York City.—A full sized standard steel platform for passenger cars (illustrated in our issue of Feb. 5, 1897, and an improved standard coupler).

Steel Tired Wheel Co., 115 Broadway, New York City.—Sections of steel tired wheels.

John S. Thurman, M. E., Indianapolis, Ind.—Models of patent lubricators, car ventilators, car couplers, mail catcher and deliverer and car seats.

Trojan Coupler Co., Troy, N. Y.—In addition to the Trojan freight and passenger car coupler and McKeen carry-irons mentioned in our last issue, the company showed a full size McKeen continuous platform for passenger cars. This platform is supported with a metal truss.

U. S. Metallic Packing Co., Philadelphia, Pa.—Pneumatic appliances, including the Dean pneumatic locomotive track sander and Gollman locomotive bell ringer, also U. S. Metallic packing for locomotives.

Universal Car Bearing Co., Charleston, W. Va.—Sample of Baker center ball car bearing. These bearings are now made by the Hewitt Mfg. Co., of Chicago, Ill.

Wendell & McDuffie, Havemeyer Bldg., New York City.—McIntosh "Duplex" pneumatic blow-off cocks, made by the Jerome Metallic Packing Co., of Chicago, Ill.

Westinghouse Air Brake Co., Wilmerding, Pa.—A full size Westinghouse friction draft gear.

Wilmington Malleable Iron Co., Wilmington, Del.—Models and two full size "Little Delaware" M. C. B. car couplers and a model of the "Diamond" freight and passenger draft attachment.

TECHNICAL.

Manufacturing and Business.

At the annual meeting of stockholders of the American Steel Casting Co., held recently in Jersey City, the present Board of Directors were re-elected. Officers were elected as follows: President, Daniel Egan; Vice-President, Wm. M. Wilson; Secretary and Treasurer, John W. Booth. At this meeting a dividend of seven per cent was declared on preferred stock, payable June 29. Of the company's six plants, four are now in operation, namely, Thurlow, Pa.; Sharon, Pa.; Pittsburgh, Pa., and Alliance, O.

The contract to furnish engines for the new continuous bar mill of the Shenango Valley Steel Co., at Newcastle, Pa., has been given to McIntosh, Hemphill & Co., of Pittsburgh, and not to the Bass Foundry & Machine Co., of Fort Wayne, Ind., as has been stated. The contract covers two 42 x 60 in. and two 50 x 60 in. engines.

W. S. Rockwell & Co., New York, have recently completed several oil-welding furnaces for the Bloomsburg Car Mfg. Co., Bloomsburg, Pa., for welding 3-in. and 3½-in. car axles.

The American Steel Foundry Co., of Granite City, Ill., will furnish 10 of the new 100,000-lb. cars for the Pittsburgh, Bessemer & Lake Erie with its new improved metal car trucks. These trucks are of the rigid diamond type.

The Brooks Locomotive Works, at Dunkirk, N. Y., has broken ground for a new paint shop. The building will be of brick, 120 ft. square.

A derrick car capable of raising 80,000 lbs. has just been completed at the shops of the Peoria & Eastern at Urbana, Ill. The car may be propelled at a speed of 10 miles an hour by its own engine.

The C. H. Haeseler Co., 1026 Hamilton street, Philadelphia, Pa., is furnishing a complete compressed air plant for the Newport News Ship Building & Dry Dock Co., consisting of a 20 x 24-in. duplex Ingersoll-Sargeant steam compressor, 24 pneumatic caulking and shipping tools and 15 pneumatic drills and reamers. This plant is said to be the largest of its kind in the country.

The Chicago Car Roofing Co., Chicago, Ill., has increased its capital stock from \$100,000 to \$500,000.

The Pottstown Iron Co., Pottstown, Pa., has made a general assignment of its property to the Equitable Trust Co., for the benefit of its creditors. The trustees have taken possession of the works, but do not propose to actively operate them pending a reorganization. The company has been in existence since 1865. It failed in 1893, at which time the Receivers were appointed, who were discharged last September.

The Pennsylvania Steel Co. has recently received an order for 7,500 tons of T rails from India. The rails will be rolled at Sparrow's Point.

The St. Louis Car Coupler Co., East St. Louis, has transferred its principal business office from East St.

Louis to Chicago. The capital stock of the company has been decreased to \$200,000.

Iron and Steel.

The Oliver & Snyder Steel Co. has decided to entirely rebuild the stack of Rosena furnace at Newcastle, Pa., which was recently damaged by an explosion, and the old stack is now being taken down. The new stack will be 100 ft. high with a 24-ft. bosh. Its capacity will be about 500 tons a day.

The Secretary of the Navy has sent a statement to the Senate concerning the cost and quantity of all the armor plate which has been supplied to the Government by the Carnegie and Bethlehem steel companies. The statement shows that the Carnegie Company has supplied 12,127 tons at prices ranging from \$515 to \$661 and that the Bethlehem Company has supplied 13,302 tons within the same range of prices.

The West Leechburg Steel & Tin Plate Co., of West Leechburg, Pa., has recently been incorporated with a capital stock of \$60,000. The company proposes building a sheet mill and a tin plate mill at West Leechburg.

No. 1 furnace of the Woodward Iron Co., of Woodward, Ala., has been blown out for repairs.

The Bellaire Steel Co., Bellaire, O., proposes making a number of improvements to its Bessemer plant. The two 5-ton converters will be replaced with two 10-ton converters, and three new cupolas will be built to replace the two now in use. A number of other improvements and additions to equipment will be made.

New Stations and Shops.

The first granite block in the foundation of the Boston terminal station was laid on June 7. Work is now being pushed as rapidly as possible. The electric and compressed air plants are soon to be installed in buildings erected on the easterly side of the train shed site.

The Canadian Pacific is building a new machine shop and engine-house at Carleton Junction, Ont., and a new passenger station at Pembroke, Ont. The buildings will all be of stone.

Plans have been prepared by the Florence & Cripple Creek for a new passenger station at Victor, Col., which will be built at the corner of Fourth street and Diamond avenue. The building will be of pressed brick, one story in height.

The Fremont, Elkhorn & Missouri Valley has given a contract for a new depot at Deadwood, S. Dak. The building is to be of brick and stone.

The Chicago, St. Paul, Minneapolis & Omaha is preparing plans for a new depot at Duluth, Minn. The new building, which will be of stone, is expected to cost about \$30,000.

The Atlantic & Pacific proposes building a new boiler shop at Albuquerque, Mex. It will be immediately west of the company's machine shops at that place and will be 62 ft. x 162 ft. The stone for the foundation is now being brought from the Putnam quarries, near Albuquerque.

The Texas & Pacific has given a contract to J. E. Boyer for the new passenger station at East Dallas, Tex. The contract price was \$10,500. It is stipulated in the contract that the building is to be completed by Sept. 5.

Work has been begun on the new freight car shops of the Atchison, Topeka & Santa Fe, at Topeka, Kan. The new building, which will be 792 x 145 ft. in size, will be immediately east of the present shops at Topeka. It is expected that the cost will be about \$65,000.

The Erie has begun work on a new passenger station at Willson avenue, Cleveland, O. The building will be of stone, one story in height.

Vim Special Hose.

The illustration shows a section of the Vim special air-brake hose. This hose is made of a heavy rubber inner tube, A, within a seamless woven cotton tube, B. This cotton tube is inclosed in another rubber tube, C, over which is still another seamless woven cotton tube, D, the whole being inclosed by an outside rubber cover, E. The cotton portions of the hose, beside being of a seamless tubular form, have their threads woven on the bias, the object of this being to obtain greater strength. The layer of rubber C is placed between the plies B and D.



with the object of forming a cushion between the cotton tubes, and thus enable the hose to bend freely. The Vim special steam hose is made after the same manner as the air-brake hose, and the rubber used in this is especially made to resist the action of steam. The result is claimed to be a pliable and soft hose, which will not kink, and which will endure without hardening. The Vim special hose is made by the Boston Woven Hose & Rubber Co., 275 Devonshire street, Boston, Mass.

Richmond Compounds on the M., K. & T.

In 1895 the Richmond Locomotive Works sent to the Missouri, Kansas & Texas four compound locomotives of the same dimensions as four simple engines built at the same time. These engines were put into identical service. In 12 months the four compounds saved 2,400 tons of coal, as compared with the consumption of the simple engines.

Gas Engines for Generating Electricity.

Mr. C. W. Andrews, General Manager of the Hamilton (O.) Gas Light & Coke Co., writes to the *Electrical Engineer* giving the results of seven years' experience with a 50-H. P. Otto gas engine driving a Westinghouse generator which is used for electric lighting. "Leaving out of consideration the items of boiler attendance, repairs, etc., we have found that the coal gas at 30 cents per thousand is equal to coal at \$2 per ton. In this connection I might mention that our engines are of the older type and use at least 20 per cent. more gas than more modern engines. With us the cost of lubrication is a very small item, as we use about three pints of filtered oil (from dynamos), one pint cylinder oil and one-half pound of grease for an eight-hour run. This would make the cost of lubrication less than 0.1 cent per kilowatt hour. The ignition tubes cost 1½ cents per day. The repairs amount to about \$50 per year on the average, or about $\frac{1}{10}$ of a cent per kilowatt hour."

THE SCRAP HEAP.

Notes.

The Erie road now runs passenger engines through between Chicago, Ill., and Galion, O., 289 miles.

Judge Amidon, of Fargo, N. Dak., has issued a temporary injunction restraining the enforcement of the new freight tariffs prepared by the State Railroad Commissioners.

The St. Louis public library is to establish branch stations at the power-houses of certain street railroads in that city, and will distribute books to the branches twice a week for the benefit of employees of the street car lines.

The Post-Office Department has recently made important additions to short-distance mail facilities in and near certain cities. On the Pennsylvania Railroad between Pittsburgh and Wall, which is 15 miles east of Pittsburgh, a postal car now makes five round trips daily.

The Supreme Court of Indiana has sustained the constitutionality of the recent law of that state limiting the fares on the street railroads of Indianapolis to three cents. The Federal Court, in an injunction suit entered by bondholders soon after the passage of the law, declared the act unconstitutional.

Division superintendents of the Pennsylvania have notified conductors and train baggagemen that in order to comply with postal regulations they must carry no mail for the Adams Express Company unless paid by the express company for the work. The new regulation prohibits railroad employees handling mail matter for the express companies unless a portion of their salaries is paid by the company for which the work is done.

According to the Memphis *Commercial* the loss suffered by the Yazoo & Mississippi Valley by the Mississippi River flood is \$350,000 or more. As heretofore noted in the *Railroad Gazette*, many miles of the road were submerged for a number of weeks. The statements of earnings since the suspension of traffic show a loss as compared with the same period of 1896 of about \$125,000, and Mr. Gilleas, Assistant General Superintendent, says that the repairs to roadbed, including the renewal of one or more important bridges, have already cost \$225,000.

The Atchison, Topeka & Santa Fe has issued instructions to ticket agents at Kansas City not to assign lower berths in sleeping cars running over its lines to persons holding passes, until all paying passengers have been accommodated. This is an eminently sensible regulation and one which should be cheerfully acquiesced in, but there will probably be the usual number of threats to transfer the valuable (?) patronage of the disgruntled passenger to some more generous line. Railroad men and those who are most entitled to consideration are not the ones who will "kick," however; it will be the local politician and those of his kind, who always feel aggrieved because the railroads do not include with their passes a free ticket for the dining car.

Oil for the Abatement of Dust.

Mr. J. H. Nichol, Assistant Engineer of the West Jersey & Seashore Railroad, has devised and patented a method to prevent dusty railroad tracks. It consists of the application of a heavy non-combustible mineral oil to the surface of the road and the sides of the cuts. The oil used has but little odor when first applied, and this disappears after a few days. The advantages claimed for this method of treatment are that it effectually lays the dust, preserves the ties; helps drainage by causing water to run off freely and prevents the growth of vegetation in the ballast. Experience has shown that the cost of the treatment will be less than \$50 a mile of single track.

More Populist Railroads.

Two thousand Populists held an indignation meeting at Mankatee, Kan., to discuss railroad freight rates, and Governor Leedy divulged to an anxious world his plan of salvation. He declared that the time had come for the people of the West to act, and he stated that they must themselves furnish the needed relief from exorbitant freight rates. He appeared as the representative of a company of railroad men who desired to go into partnership with the public in building a railroad from some point in central Nebraska through Kansas, Oklahoma, Indian Territory and Texas to the Gulf. He said the company was able and ready to

complete the road, provided the public would take the majority interest in it, and that the public need not put up one cent until the railroad should be completed. The proposition was that the states and municipalities should hold the majority of stock. The men associated with him did not propose to take in any outside capital save that of the states and municipalities. Prominent Texans, the governor said, had expressed a willingness to take hold of the scheme, and he believes that Texas is willing to invest some of the \$22,000,000 of her surplus school funds in securing more equitable freight rates. It is claimed, too, that the 4,500 convicts in Texas could be put to work on the road, the state receiving pay for their labor in first mortgage bonds.

The Canadian Fast Steamships.

The Canadian government has made public the papers relating to the fast Atlantic scheme. The documents include copies of the proposition of Messrs. Peterson, Tait & Co., the reply of the government thereto, and the agreement as finally ratified. Peterson, Tait & Co. undertake to provide four steamships of not less than 10,000 tons gross and of a speed of 21 knots per hour. They are to have a capacity of 1,500 to 2,000 tons of freight. There is also to be provided cold storage capacity for 500 tons of freight on each vessel, while the passenger accommodation is to be for at least 300 first, 200 second, and 400 steerage. Steerage passengers must be carried for \$15 per head. The steamers are to be constructed under Admiralty supervision, and to be up to the standard of the best ocean vessels afloat. They are to be not less than 525 ft. long, with a draft of 25 ft. 6 in., which is the navigable depth of the St. Lawrence Channel. The winter port is to be either Halifax or St. John, at the option of the contractors. By May 31, 1899, the service will be commenced with two steamers, the remaining two not to be put on the route until May, 1900, when the service will be weekly. For the first year the steamers will give a fortnightly service only, and during that time will receive only one-half the stipulated subsidy of £154,500 annually.

Besides the steamships, which are to be capable of conversion into cruisers in time of war, the company is to provide a fast tender, of the torpedo boat type, of a speed of not less than 23 knots, which shall meet the steamers on their arrival in the St. Lawrence, with a pilot on board to bring the steamer up to Quebec.

It is exacted that the company shall carry the mails free, and not discriminate against Canadian railroads, nor accept a subsidy from any other country, nor call at a foreign port. The contract is for 10 years, and the security deposited is \$100,000.

An Ethical Point in Railroad Service.

President E. P. Ripley, of the Atchison, Topeka & Santa Fe, has issued a circular notifying officers and employees of the company that they must maintain a scrupulous watch over their acts, rigidly restricting their outside interests to the end that they shall be above suspicion. The circular says:

"First—The entire working time of all employees is paid for by the company, and must be devoted to its interests. No officer or employee will be permitted to engage in other business occupying any part of his time, or requiring his attention, without the express sanction of the undersigned in writing.

"Second—It is also manifestly improper that officers or employees having charge of or influencing the making of rates, the purchasing or ordering of material, or the distribution of equipment should have any private investments or interests which may in any manner affect the absolute neutrality with which all patrons of the road must be treated, or which may even give rise to suspicion that such neutrality is not observed. No employee is justified in occupying a position in which his private interests may conflict with his official duty.

"Third—It is realized that employees must invest their savings somewhere, and that in general they can do so to the best advantage along the lines of the company, because of their knowledge and continuity, and it is not desired to discourage such investment, except on the part of those mentioned in paragraph 2, and in cases where such investment may be affected by their official action.

"Fourth—Officers or employees already having obligations or investments of the character herein described, and which cannot be disposed of except at a sacrifice, will report the same to the general manager of the road on which they are employed, for his information and consideration, and the latter will forward the same to the undersigned, with his recommendation in the premises."

New York State Canals.

On June 8 the State Canal Board approved plans for canal improvements, the estimated cost of which is \$2,873,852. Of this amount, \$1,683,555 is for work on the eastern division of the Erie Canal, and \$1,190,297 for work on the middle division. The total amount of work under the \$9,000,000 appropriation, contracts for which are either awarded or to be awarded in the near future, is \$6,190,527. The plans just approved are for 22 contracts.

An Unusual Accident.

A peculiar accident occurred on the Illinois Central, on the morning of June 7, where by two passengers and three section men were injured. A northbound express train in passing a car where the section men were loading rails, struck a rail in such a manner that one end broke through the door of a passenger coach, the other end projecting out over the adjacent tracks.

LOCOMOTIVE BUILDING.

The Pittsburgh Locomotive Works has received from the Baltimore & Ohio an order to build 15 locomotives.

The Southern Railway has given an order for 10 locomotives to the Richmond Locomotive Works, of Richmond, Va.

The Great Northern has given an order to the Brooks Locomotive Works, of Dunkirk, N. Y., for 15 moguls with 19 x 26 in. cylinders.

The Houston & Texas Central has ordered two 6 wheel switching engines with 10 x 24-in. cylinders from the Schenectady Locomotive Works.

The Florida East Coast has given an order to the Schenectady Locomotive Works, of Schenectady, N. Y., for five 10-wheel passenger locomotives with 18 x 24 in. cylinders.

The Detroit, Grand Rapids & Western has given an order to the Schenectady Locomotive Works, Schenectady, N. Y., for two 8-wheel passenger locomotives with cylinders 18 x 24 in.

The Cleveland, Cincinnati, Chicago & St. Louis has just completed at its Brightwood shops a new passenger locomotive with 18 x 24-in. cylinders. The new engine is equipped with Westinghouse quick-action brakes and Curtis air track sanding device.

The Schenectady Locomotive Works, Schenectady, N. Y., is building eight 10-wheel compound freight locomotives with cylinders 22 and 34 x 26 in. for the Northern Pacific. These locomotives are duplicates of two of

the same class built for the Northern Pacific by the Schenectady Works last March.

The Baldwin Locomotive Works, Philadelphia, has just received a contract to build for the Japanese government 18 American type passenger locomotives. These engines are to have driving wheels 5 ft. in diameter and cylinders 16 x 24 in. They will have six-wheel tenders. The engines are to be built subject to the inspection of Col. Joseph U. Crawford, Engineer of Branch Lines of the Pennsylvania Railroad.

CAR BUILDING

The Mobile & Ohio is in the market for 10 passenger cars.

The Westmoreland Coal Co. has given an order for 100 cars to the Allison Manufacturing Co.

The Pullman Car Co. has recently delivered to the Cincinnati, Hamilton & Dayton a new state-room sleeping car, the "Sardinia."

The Buffalo, Rochester & Pittsburgh has placed an order with the Buffalo Car Manufacturing Co., of Buffalo, N. Y., for 200 freight cars.

The Gulf & Interstate has given an order to the Missouri Car & Foundry Co., St. Louis, Mo., for 20 platform cars, of 60,000 lbs. capacity. They will be fitted with M. C. B. couplers.

The Canadian Pacific has built a state-room sleeping car to run on its transcontinental line. A number of cars of this kind will be built to meet the requirements of English tourists and other passengers who demand the English brand of privacy when they travel through Canada.

BRIDGE BUILDING.

Carlisle, Pa.—The County Commissioners have given the contract for the new bridge over Yellow Breeches Creek, near Hatton, to Nelson & Buchanan, at \$4,789.

Cattawissa, Pa.—The following bids for the new steel bridge over the North Branch of the Susquehanna River were opened by the Board of Public Buildings and Grounds, at Harrisburg, on June 15: New Jersey Steel & Iron Co., \$74,600; Carnegie Steel Co., Ltd., \$79,500; Toledo Bridge Co., four proposals, lowest \$74,360, highest \$76,700; Berlin Iron Bridge Co., \$81,319, and \$82,150; Pencoyd Bridge and Construction Co., \$82,000 and \$85,000; Pennsylvania Steel Co. (nine bids), \$69,000 lowest, \$70,610 highest; Campbell & Klindeman, Allenwood (eight bids), \$68,000 lowest, \$81,400 highest; King Bridge Co. (four bids), \$75,259 lowest, \$77,869 highest; House & Construction Co., Philadelphia, \$62,950; Pittsburgh Bridge Co. (nine bids), \$62,000 lowest, \$94,000 highest; Fort Pitt Bridge Works, \$68,990 and \$69,900; Wrought Iron Bridge Co., \$127,072 and \$128,233; Youngstown Bridge Co., \$79,500; Lucas, Quill & Co., Allentown, \$69,511.

Columbus, O.—The County Commissioners have ordered the County Engineer to make plans for a 59-ft. plate girder span over Big Run on the Jackson Pike.

Diamond, Pa.—The county will replace the old bridge across the east branch of Sugar Creek at this place with an iron one.

Gettysburg, Pa.—Bids are asked, June 30, on a 215-ft. iron or steel bridge across Big Conowago, at Kuhn's fording on the line of Reading and Hamilton townships. Specifications can be seen at the County Commissioners' office. E. P. Sachs, County Clerk.

Goldboro, N. C.—The County Commissioners are asking for estimates on a drawbridge to be built across the Neuse River, near this place. The Chairman of the Board, with office here, has the matter in charge.

Grand Rapids, Wis.—The contract for the new four span bridge of the Green Bay & Western Railway, across the Wisconsin River at this point, has been let to the Wisconsin Bridge & Iron Co., Milwaukee.

Hickory, N. C.—The County Commissioners are asking for bids on an iron and steel bridge across the Catawba River, near here. The bridge will be about 150 ft. long.

Kansas City, Mo.—The Missouri Pacific, it is said, contemplates building a bridge of its own across the Kaw River, alongside the one it now occupies jointly with the Union Pacific.

London, Ont.—The contract for the steel bridge at the foot of King street has been awarded to the Central Bridge & Engineering Co., Peterborough, for \$6,020. The bridge will be 163 ft. long in one span.

Raleigh, N. C.—The Southern Railway will build an iron bridge across Lenoir street, 60 to 75 ft. wide, with stone abutments, as required by the Board of Aldermen.

Sharon, Pa.—The Mercer County Commissioners have awarded the contract for the Franklin street bridge, Sharon, to the Penn Bridge Co., Beaver Falls, at \$8,900.

Stratford, Ont.—Tenders for a steel bridge to be built on the boundary of West Zorra and Gorge of Downie, near Fairview, being 45 ft. in the clear, with a 14-ft. roadway, are being received by John Corrie, Inspector, up to June 29.

Wilkes-Barre, Pa.—Bids will be received at the office of the County Controller on June 19 for the 29 stone arch and 3 iron bridges at a total estimated cost of over \$15,000.

Williamsport, Pa.—The Grand Jury recommends new iron bridges over Little Pine Creek, near English Centre, and over Block House Fork, in Jackson Township, at an expenditure not to exceed \$900 and \$1,500 respectively.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Bald Eagle Valley, 5 per cent., payable Aug. 1.

Boston, Revere Beach & Lynn, 1 per cent., payable July 1.

Canadian Southern, semi-annual, 1 per cent., payable Aug. 2.

Chicago, St. Paul, Minneapolis & Omaha, 3½ per cent. on preferred stock, payable Aug. 20.

Chicago & Western Indiana, quarterly, 1½ per cent., payable July 1.

Des Moines & Fort Dodge, 6 per cent. on preferred stock, payable Aug. 2.

East Mahanoy, 2½ per cent., payable June 15.

Lake Shore & Michigan Southern, semi-annual, 3 per cent., payable Aug. 2.

Michigan Central, semi-annual, 2 per cent., payable Aug. 2.

Minneapolis & St. Louis, 2½ per cent. on first preferred stock and 1½ per cent. on second preferred stock, both payable July 15.

New York Central & Hudson River, quarterly, 1 per cent., payable July 15.

New York, New Haven & Hartford, quarterly, 2 per cent., payable July 1.

Northern of New Hampshire, quarterly, 1½ per cent., also extra 3 per cent., both payable July 1.

Rock Island & Peoria, 2½ per cent., payable July 1.

St. Louis & San Francisco, 2 per cent., payable June 22.

Capital Traction (Washington, D. C.), 60 cents, payable July 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Oregon Railway & Navigation Co., annual, Portland, Or., June 21.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Train Despatchers' Association of America will hold its tenth annual convention at Detroit, Mich., on June 22, 1897.

The American Society of Railroad Superintendents will hold its next meeting at Nashville, Tenn., beginning Sept. 22.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The American Street Railway Association will hold its sixteenth annual convention in Convention Hall, Niagara Falls, Oct. 19-22, 1897.

The Association of Engineers of Virginia holds its formal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 1 p. m.

The Association of Railway Telegraph Superintendents will hold a convention at Niagara Falls, N. Y., on June 16, 1897.

The Boston Society of Civil Engineers meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The Canadian Society of Civil Engineers meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The Civil Engineers' Club of Cleveland meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The Civil Engineers' Society of St. Paul meets on the first Monday of each month, except June, July, August and September.

The Denver Society of Civil Engineers meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The Engineering Association of the South meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The Engineers' and Architects' Association of Southern California meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The Engineers' and Architects' Club of Louisville meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The Engineers' Club of Cincinnati meets at the rooms of the Literary Club, No. 25 East Eighth street, Cincinnati, O., on the third Thursday in each month, at 7:30 p. m. Address P. O. Box 333.

The Engineers' Club of Columbus, (O.), meets at 12¼ North High street, on the first and third Saturdays from September to June.

The Engineers' Club of Minneapolis meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The Engineers' Club of Philadelphia meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The Engineers' Club of St. Louis meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Society of Western New York holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The Engineers' Society of Western Pennsylvania meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The Montana Society of Civil Engineers meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The New England Railroad Club meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The New York Railroad Club meets at 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The North-West Railway Club meets on the first Tuesday after the second Monday in each month, at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

The Northwestern Track and Bridge Association meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

The Ohio State Tramway Association will hold its next meeting at Columbus, O., on June 15.

The Railway Signalling Club will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago.

The St. Louis Railway Club holds its regular meeting on the second Friday of each month, at 3 p. m.

The Southern and Southwestern Railway Club meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The Technical Society of the Pacific Coast meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The Western Foundrymen's Association meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is secretary.

The Western Railway Club meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736-1738 Monadnock Block, Chicago.

Freight Commissioners' Association.

The Freight Commissioners' Association of the United States was organized at a meeting held in Cincinnati on June 9, and the following officers were elected: Chairman, J. S. Purse, Savannah; Secretary, N. B. Kelly, Philadelphia; Treasurer, E. P. Wilson, Cincinnati. The pooling bills, the Sherman Anti-Scalping bill and other measures were discussed at the meeting, but no action was taken.

Meeting of the Railroad Club Secretaries.

The Secretaries of the various railroad clubs was held at Old Point Comfort, on Monday, June 7. At this meeting it was decided that the former practice of sending club proceedings to every member of each club be discontinued, and instead, each club will in the future distribute its proceedings among its own members only. Members of one Railroad Club will, however, be furnished the proceedings of other clubs at cost.

Commencement Week at Lehigh University.

At Lehigh University, Rev. Thomas B. Angell, D. D., of Harrisburg, Pa., preached the baccalaureate sermon on Sunday last. On Monday, the class day exercises were held in the afternoon and the Junior hop in the evening. On Tuesday, the alumni luncheon was served at 12 o'clock, followed by the annual meeting of the Alumni Association at 2 o'clock, and the lacrosse game later in the afternoon. At the alumni meeting it was announced that Prof. H. Wilson Harding, who has been at the head of the Department of Physics and Electrical Engineering for many years, would retire from active service, and Prof. W. S. Franklin, of the Iowa State College, would take his place. In the evening of the same day, the President's reception was held in the gymnasium. The commencement exercises were held on Wednesday morning, and besides the orations by members of the graduating class, Mr. Caspar W. Haines delivered an address. The libraries, laboratories, drawing-rooms, museums and collections have been opened for the inspection of visitors during the week.

Franklin Institute.

The Bulletin of the Franklin Institute for June and July announces the stated meeting of the Board of Managers for Wednesday, July 14, at 1 p. m. The committee desires suggestions from the members respecting subjects to be included in the autumn and winter lecture courses. The Mining and Metallurgical Section, which was recently organized, reports a membership of 62. Meetings will be held at short intervals, and it is proposed to publish the papers in a monthly journal. The members of the Franklin Institute will secure the privileges of this section without an additional expense. Those who are interested in mining and metallurgical work and desire to join this section are requested to inform the Secretary and have their names enrolled as soon as possible.

On Wednesday, June 16, the following papers were read at the regular meeting of the Institute: "A General System for the Sewerage of Suburban Philadelphia," Howard Murphy, Civil Engineer; "The Hutchinson Smoke-Consuming Furnace," Col. C. Walseley Cox.

At the meeting of the Chemical Section held June 15, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa., President of the Chemical Section, delivered a lecture on "A Critical Review of Methods for Determining Minerals."

Commencement Week at Stevens Institute.

At Stevens Institute, the exercises began on Sunday last by the baccalaureate sermon by Rev. George C. Houghton, D. D., of Hoboken, N. J. On Monday the sophomore class cremated calculus on the Campus. On Tuesday afternoon President and Mrs. Morton gave a reception to the faculty, alumni and the graduating class, and in the evening of the same day the Alumni Association met in the hall of Stevens School. One of the interesting features of this meeting was the address by Edward P. Roberts, of Cleveland, O., President of the Alumni Association, on the subject "The Mechanical Engineer as a Citizen," which was read by the secretary, Mr. F. D. Furman. He dwelt principally on the necessity of the graduates to study social and economic problems and cautioned the engineer not to draw hasty conclusions in regard to the relation between capitalists and laborers, inasmuch as it was a subject that required very careful deliberation. President Morton, members of the faculty and a number of the alumni made short addresses, touching principally on the success of the twenty-fifth anniversary celebration, and a few discussed briefly some of the points raised by Mr. Roberts in his address. It was announced that over \$12,000 had been secured for the new building fund, the larger part of which was due to the generosity of the President. On Wednesday the class day exercises were held at Castle Point. The commencement exercises were held Thursday evening and included a short address by President Henry Morton, the salutatory address by Mr. H. D. Tiemann, the valedictory address by Mr. William D. Ennis and the address to the graduating class by Mr. Henry R. Towne.

Annual Convention of the Electric Light Association.

The twentieth annual convention of the National Electric Light Association, held at Niagara Falls June 8, 9 and 10, was considered by the delegates to be one of the most successful gathering in the history of the organization. The papers were presented by men of recognized high standing and the topics treated were for the most part subjects of considerable importance. The paper on "Recent Progress in Arc Lighting," by Prof. Elihu Thomson, contained much that was entirely new along the line of the development of arc lighting. The papers by Mr. Arthur Wright, of Brighton, England, on "Profitable Extensions of Electricity Supply Stations" was freely discussed, and the "Niagara-Buffalo Transmission Line," presented by Mr. J. G. White, brought out an animated discussion, in which much desirable information was given. The question of municipal ownership of electric light plants was considered at some length by Mr. W. W. Bean, St. Joseph, Mo., and gave the results of careful personal investigation into the subject, with the result of not favoring municipal ownership under any condition. The attendance was unusually large and the exhibition of electrical apparatus made by the different supply houses throughout the country was very complete. The exhibit of the Westinghouse Electric & Manufacturing Co. was especially attractive. The company showed several induction motors, direct current generators, alternating current generators, switchboard apparatus, lightning arresters, converters, arc and incandescent lamps, the latter forming an exhibit made by the Sawyer Man Electric Co., of Allegheny City, Pa. The following officers were elected for the ensuing year: President,

Samuel Insull, of Chicago; First Vice-President, A. M. Young, of Waterbury, Conn.; Second Vice-President, George R. Stetson, New Bedford, Mass.; new members Executive Committee: W. Worth Bean, St. Joseph, Mich.; W. McLea Walbank, Montreal; F. A. Gilbert, Boston; E. H. Stevens, Elizabeth, N. J.; former members holding over, W. R. Gardener, John A. Seely, G. A. Redman, A. J. De Camp and H. A. Wagner.

PERSONAL.

—Mr. R. C. Wright has been appointed Soliciting Freight Agent of the Pennsylvania, with headquarters at Baltimore, Md.

—Mr. T. J. Shannon, Supervisor of the Columbus, Hocking Valley & Toledo at Logan, O., died at his home in that place on June 3.

—Mr. W. W. Buffum has been appointed Division Superintendent of the American Refrigerator Transit Co., with headquarters at Buffalo, N. Y.

—Mr. Frederick A. Boland, civil and mechanical engineer, has opened an office at Hartford, Conn., for the practice of engineering and the solicitation of patents.

—Mr. I. W. Starr has been appointed Superintendent of Terminals of the Atchison, Topeka & Santa Fe, at Kansas City, Mo., to succeed Mr. John Z. Roraback, resigned.

—Mr. C. W. Jones has been appointed District Passenger Agent of the Northern Pacific at Des Moines, Ia., to succeed Mr. C. C. Mordough, who has been transferred to Milwaukee.

—Mr. I. H. Burgoon, Superintendent of the Ohio Southern, with office at Springfield, O., has resigned and has been succeeded by Mr. N. E. Matthews, one of the Receivers of the road.

—Mr. Charles C. Culross has been appointed Assistant Superintendent of the Wyoming Division of the Union Pacific under Superintendent L. Malloy, with headquarters at Laramie, Wyo.

—Mr. J. B. Scott, Jr., formerly Traveling Passenger Agent of the Baltimore & Ohio Southwestern, at Vincennes, Ind., has been transferred to Cincinnati, O., to succeed Mr. J. F. McCarty, resigned.

—Mr. J. H. Kelsall, heretofore Chief Clerk of the Roadway Department of the San Antonio & Aransas Pass, has been appointed Assistant Superintendent of Roadway, Bridges and Buildings of that road.

—Mr. William Keutgen, Secretary of the Staten Island Rapid Transit Co., died on June 9 of appendicitis, aged 46. Mr. Keutgen had been Secretary of the Staten Island Rapid Transit since its formation by Erastus Wiman.

—Mr. Aubin L. Boulware, a director of the Southern Railway, died at his home in Richmond, Va., on June 12. Mr. Boulware was a graduate of the University of Virginia and a prominent member of the bar of that state.

—Mr. A. M. Lane, heretofore Assistant Superintendent of the West Virginia & Pittsburgh, has been appointed Superintendent. Mr. Lane's former office has been abolished. His headquarters are at Weston, W. Va.

—Mr. George W. Snyder, Supervisor of the Pennsylvania at Kane, Pa., has been transferred to Baltimore as Supervisor of the First Division of the Northern Central. Mr. Snyder will be succeeded at Kane by Mr. E. F. Jordan.

—Mr. A. Monnom, General Manager of the Monterey & Mexican Gulf, with headquarters at Monterey, Mex., has resigned and will return to his home in Belgium. He will be succeeded by Mr. J. H. Mathey, of Brussels, Belgium.

—Mr. A. W. Thompson, General Manager of the Continuous Rail Joint Co. of America, died recently at his home at Madison, N. J. Mr. Thompson was a regular attendant at the annual conventions of the Roadmasters' Association of America.

—Mr. Frank P. Welsh has resigned as Receiver of the Fort Wayne, Terre Haute & Southwestern, a short line in Indiana operated by the Chicago & Southeastern, and has been succeeded by Frank L. Winsor, whose headquarters will be at Rock Island, Ill.

—Mr. E. T. Campbell has been elected Chairman of the Southwestern Traffic Bureau (late the Southwestern Traffic Association). Mr. Campbell was formerly assistant to Mr. Day, who, on the reorganization resigned and went to the Minneapolis & St. Louis.

—Mr. Coke Alexander, formerly District Passenger Agent of the Missouri Pacific, at Indianapolis, Ind., has been appointed General Agent of the Louisville, Henderson & St. Louis, and Agent of the Cumberland Gap Dispatch, with headquarters at Evansville, Ind.

—Mr. W. F. Larimer has been appointed Chief Dispatcher of the Utah Division of the Oregon Short Line, with headquarters at Salt Lake City, to succeed Mr. A. H. Stewart, resigned. Mr. Larimer was formerly Chief Dispatcher of the Union Pacific, at Green River, Wyo.

—Mr. Egbert T. Sees, Treasurer of the National Railway Publication Co., proprietors of the *Official Railway Guide*, died at his home in Elizabeth, N. J., on June 13. Mr. Sees was born in Harrisburgh, Pa., and was 67 years old. He had been connected with the company since 1872.

—Mr. John W. Shaw died on June 15 at his home in New York City. Mr. Shaw was President of the Columbus, Hocking Valley & Toledo from 1887 to 1889. He was born at Kingston, N. Y., in 1835. Most of his life was spent in the West, where he was interested in many business enterprises.

—Mr. T. B. Hamilton, formerly Assistant to the Engineer of Maintenance of Way of the Pittsburgh Division of the Pennsylvania Railroad, has been appointed Engineer of Maintenance of Way of the Toledo Division of the Pennsylvania Company, with headquarters at Toledo, O., to succeed Mr. L. G. Haas, transferred.

—Mr. W. W. Johnson has been appointed Commercial Agent of the Chicago, Burlington & Quincy at Beatrice, Neb., to succeed Mr. John Dwyer, deceased. Mr. Johnson has been General Agent of the company at Billings, Mont., and will be succeeded in that position by Mr. H. B. Segur, now General Agent at Atchison, Kan.

—Mr. George Y. Wisner, M. Am. Soc. C. E., has resigned as Sanitary Engineer to the Health Board of the city of Detroit, to take effect July 1. The reason for his resignation is that his private business requires all of his time. He has been Sanitary Engineer for the Board since June, 1895, and is reputed to have made great improvements in the administration of the affairs of the Board.

—Mr. J. L. Snelling has been appointed Superintendent of the First Division of the Boston & Albany, with headquarters at Boston, Mass., to succeed Mr. H. B. Chesley, deceased. The appointment took effect June 14. Mr. Snelling has been for the last two years Agent for the company at Worcester, Mass., and previous to that time was Agent at East Albany. His successor at Worcester has not yet been announced.

—Mr. W. H. Masters, for the last four years Commissioner of the New Orleans Freight Bureau, has resigned to become the representative of the Southern Pacific on the Board of Managers of the Southwestern Traffic Bureau at St. Louis. The appointment of experienced traffic officials to membership on this Board would seem to indicate that the "bureau" is to be something more than a mere clerical office for filing and comparing tariffs.

—Mr. J. E. Galbraith, General Freight and Passenger Agent of the International & Great Northern, with headquarters at Palestine, Tex., has resigned. He will be succeeded by Mr. G. H. Turner, heretofore Assistant General Freight Agent of the Texas & Pacific, at Dallas, who will be General Freight Agent, and Mr. D. J. Price, heretofore Assistant General Passenger Agent of the International & Great Northern, who will be General Passenger Agent.

—Mr. H. E. Felton, formerly General Freight Agent of the Chicago & Eastern Illinois, with headquarters at Chicago, has been appointed General Freight Agent of the Lake Shore & Michigan Southern, with headquarters at Cleveland, O., to succeed Mr. G. J. Grammer, who was some time ago appointed General Traffic Manager of the company. Mr. Felton will be succeeded on the Chicago & Eastern Illinois by Mr. William Campbell, formerly Assistant General Freight Agent of that company.

—Mr. Charles Howard Warren has been appointed Assistant to President Maxwell, of the Central Railroad of New Jersey, the office being a new one. Mr. Warren was born in 1856 at Carlton, Orleans County, N. Y., and entered railroad service at the age of 20 as Clerk in the Freight Auditor's office of the Chicago & Northwestern. He was afterward connected with the Chicago, Rock Island & Pacific and the St. Paul, Minneapolis & Manitoba, being appointed General Passenger Agent of the latter road in January, 1884, and Comptroller in 1888. He was appointed General Manager of the Great Northern, the successor of the St. Paul, Minneapolis & Manitoba, on Aug. 1, 1894, and held that position until the latter part of last year.

—Col. Frank Huger, Superintendent of Transportation of the Norfolk & Western, with headquarters at Roanoke, Va., died suddenly at that place on June 10. Colonel Huger was born at Fortress Monroe, Va., in 1837, and graduated from the United States Military Academy at West Point in 1861. He entered railroad service in 1865 as Secretary of the Norfolk & Petersburg. In 1867 he was appointed Master of Transportation of the Virginia & Tennessee, holding that office until 1880, when he went to the Atlantic, Mississippi & Ohio as Superintendent of Transportation. He was appointed Superintendent of the Western Division of the Norfolk & Western, April 1, 1882, and held that office until July 1, 1888, when he was appointed to his late position as Superintendent of Transportation. Colonel Huger served with distinction in the Confederate army during the war.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—Andrew Stevenson, formerly Division Freight Agent at Baltimore, has been appointed Assistant General Freight Agent, with headquarters at the same place. George J. Lincoln, formerly Division Freight Agent at Philadelphia, has been appointed Commercial Freight Agent, with headquarters at the same place. Both appointments will take effect July 1. The offices of Division Freight Agent at both Baltimore and Philadelphia will be abolished.

Chicago, St. Paul, Minneapolis & Omaha.—At the annual meeting of stockholders, held at St. Paul, Minn., on June 5, the present officers and directors were re-elected, with the exception that Horace C. Burt was elected a director to succeed E. W. Winter.

Cincinnati, Hamilton & Indianapolis.—At the annual meeting of the stockholders of this road, a leased line of the Cincinnati, Hamilton & Dayton, held at Indianapolis, Ind., on June 11, the present officers and Board of Directors were re-elected, with the exception that R. B. Turney was elected a Director to succeed A. Evans.

Columbus, Sandusky & Hocking.—Receiver Felton has appointed A. W. Dunning Auditor and W. D. McKinney Cashier.

Des Moines & Fort Dodge.—At the annual meeting of Directors, held recently at Des Moines, Ia., C. N. Gilmore was elected President, and Carroll D. Wright Secretary for the ensuing year.

Duluth, Superior & Western.—At the annual meeting of stockholders, held recently at Duluth, Minn., the present officers of the company were re-elected for the ensuing year.

Erie & Wyoming Valley.—At the recent annual meeting of stockholders, Directors were elected as follows: E. B. Thomas, J. G. McCullough, W. A. May, George B. Smith, W. V. S. Thorne, A. H. McClintock and A. D. Blackinton. The present officers of the company were re-elected.

Pennsylvania.—W. H. Drayton, Jr., Acting Division Freight Agent of the United Railroads of New Jersey Division, with headquarters at Philadelphia, has been appointed Division Freight Agent at the same place to succeed E. G. Dixon, resigned.

Port Jervis, Monticello & New York.—Martin B. Waller has been appointed General Superintendent to succeed S. D. Lake, resigned. The other officers of the company are: President, Thomas M. Waller; Vice President, George B. McKibbin; Treasurer, S. Harrison Wagner; General Passenger and Freight Agent, H. G. Cox; General Manager, F. H. Reed.

Portland, Saco & Portsmouth.—At the recent annual meeting of stockholders of this company, a leased line of the Boston & Maine, the following Directors were elected: S. C. Lawrence, Lucius Tuttle, Walter Hunnewell, F. B. Barrett, E. A. Whitney and F. B. Carpenter.

Queen Anne's & Kent.—At the annual meeting of stockholders of this road, a leased line of the Pennsylvania, held recently at Centerville, Md., the following officers and Directors were elected: President, William A. Patton; Secretary, Robert H. Groff; Treasurer, Robert W. Smith; Directors, William A. Patton, M. Reibenack, D. S. Nerval, F. D. Howell, R. D. Barclay, John P. Green and Kane S. Green.

Rensselaer & Saratoga.—At the annual meeting of the stockholders of this company, a leased line of the Delaware & Hudson Canal Co., held at Waterford, N. Y., on June 7, officers were elected as follows: President, George H. Cramer; Vice-President, George B. Warren; Secretary and Treasurer, John H. Neher.

Rio Grande Western.—W. C. McBride, heretofore Traveling Freight Agent, with headquarters at Salt Lake City, has been appointed General Agent of the Freight Department, with headquarters at Butte, Mont. W. H. Paul, formerly Freight Claim Agent, with headquarters at Salt Lake City, has been appointed General Agent of the Freight Department, with headquarters at Portland, Or.

Saratoga & Schenectady.—At the annual meeting of stockholders of this road, a leased line of the Delaware & Hudson Canal Co., held at Waterford, N. Y., on June 7, officers were elected as follows: President, George H. Cramer; Vice-President, George B. Warren; Secretary and Treasurer, John H. Neher.

Texas & Pacific.—J. B. Paul, heretofore Superintendent of the Rio Grande Division at Big Springs, Tex., has been appointed Superintendent of the New Orleans Division, with headquarters at New Orleans, La., to succeed N. G. Pearsall. John W. Ward has been appointed Superintendent of the Rio Grande Division, with headquarters at Big Springs, Tex., to succeed Mr. Paul.

Winona & Western.—At the annual meeting of stockholders, held recently at Winona, Minn., the following officers were elected for the ensuing year: President, H. W. Lamberton; Vice-President, V. Simpson; Secretary, Thomas Simpson; Treasurer, M. G. Norton.

Winona Bridge.—At the annual meeting of stockholders, held recently at Winona, Minn., the following officers were elected: President, M. G. Norton; Vice-President, J. A. Jordan; Secretary, H. W. Weiss; Assistant Secretary, Thomas Simpson. John J. Mahoney has been appointed Superintendent.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Atlanta & Alabama.—The preliminary surveys of this road, which is proposed to connect Atlanta, Ga., with Selma, Ala., have been completed and the work of location is to be begun at once. President R. M. Mitchell states that it is proposed to begin construction work some time during July, provided a subscription of \$200,000 to the capital stock of the company is made by the citizens of Atlanta. The proposed route from Atlanta to Selma is almost an air line, the distance as shown by the surveys, being 180 miles. It is proposed when the line is completed to Selma to build a further extension southward.

Canadian Pacific.—Arrangements for building the proposed line from Lethbridge, Northwest Territory, west 330 miles to the important mining district at Nelson, B. C., via McLeod and the Crow's Nest Pass, have been concluded with the Canadian government. A subsidy of \$11,000 a mile for the 330 miles will be given by the government, in return for which certain concessions will be made by the railroad company: local freight rates on the new line and between points on that line and other points on the Canadian Pacific are to be under the control of the Governor in Council, or of a permanent railroad commission, in the event of such a commission being established, and certain other rates are to be reduced by the railroad company; of the coal lands granted by the British Columbia government in aid of the new line, 50,000 acres are to be transferred to the Dominion government; furthermore, the new line will be subject to the provisions of the general railroad act which grants trackage rights to other companies. A report from Montreal states that the company has already given a contract for the new line to D. Mann and William McKensie, of that place, and that construction work is to be begun this season. It is expected that the work will be sub-let by the contractors.

Columbia & Kootenay.—The contract for the first 16 miles of the Slocan extension of this road was let on June 14 by Superintendent Marpole to Messrs. Ponpore, McVeigh & Co., of Nelson, B. C. The contract for the rest of the line will be let shortly. The extension will run from a point on the main line near the mouth of the Slocan River north about 30 miles to the south end of Slocan Lake.

Galveston, Brazos & Southwestern.—The preliminary surveys for this proposed road in Texas have been completed from Fairwood, Tex., 12 miles from Galveston, west via Angleton, Columbia and Hardeman to Bay City, Tex., 65 miles. The surveys are now at work between Bay City and a point on the Texas Mexican road in Jackson County, which is said to be the objective point of the road.

Gulf, Colorado & Santa Fe.—The contract for reducing the grades on the main line between Cleburne and Fort Worth, Tex., 29 miles, has been awarded to Ricker & Lee, of Galveston, Tex., who will begin work at once. The work will include the excavation of 30,000 cu. yds. of earth, 10,000 of loose rock, and 55,000 of solid rock, and there will be 220,000 cu. yds. of earth embankment. The amount of the contract is said to be about \$125,000. It is expected that on the completion of this work certain other portions of the main line will be improved in the same way.

Hudson River & Berkshire.—The bill to authorize the construction of this road in Massachusetts, which was passed by the Massachusetts Senate on May 27, has been signed by Governor Wolcott. The road is proposed to extend from Ancram, N. Y., where it will connect with the Poughkeepsie & Eastern, in a general easterly direction to Springfield, Mass., passing through Egremont, Great Barrington, Monterey, Otis, Tolland, Sandisfield, Granville, Southwick, Westfield and Agawam. At Springfield, connection will be made with the Boston & Maine. The company was incorporated in New York last January with a capital stock of \$100,000. The Directors are John B. Yale, William S. Chapman, William R. Burnett, James L. Simmons, Arthur L. Davis, James C. Ritchie, William B. Chapman, M. G. Read and C. J. Walton.

Jasper Southern.—The organization of this company in Texas has been completed by the election of the following officers: President, W. J. B. Adams; Jasper; Vice-President, E. A. Fletcher, Beaumont; Secretary, L. P. Scarborough; Treasurer, E. A. Seale, Jasper. The company proposes building a line from Jasper south to a connection with the Gulf, Beaumont & Kansas City, which now extends from Beaumont north 51 miles to Kirbyville. Preliminary surveys of the line have been made and location has already been begun. W. W. Blake is Chief Engineer and E. I. Kellie is Superintendent.

Jonesboro, Lake City & Eastern.—Right of way for this proposed road in Arkansas has been obtained for a distance of 8 miles out of Jonesboro, and it is proposed to begin grading within a few days. The road will extend from Jonesboro east 12 miles to Lake City via Nettleton, and will pass through a rich timber and agricultural district. J. E. Jones, Jonesboro, is President and A. J. Kerfoot is General Manager.

Kansas City, Pittsburgh & Gulf.—The first passenger train was run over the line from Kansas City to Hornbeck, La., 653 miles, on June 8, and it is now expected that the road will be completed to Port Arthur by July 1. All grading on the line has been done and tracklaying is being pushed rapidly, having been carried to a point 40 miles south of Hornbeck on June 9. The road has been completed from Port Arthur north to Beaumont, Tex., 20 miles, and regular train service has been begun over that portion of the line. A large force of men is now at work at Port Arthur, laying terminal tracks. The company is building a ship canal from Port Arthur to the town of Sabine Pass, along the west bank of Sabine Lake, which will give connection with deep water in the Gulf of Mexico. Until this canal is made a steam lighter, with capacity for 14 freight cars, will be used to carry freight to deep water.

Lake Manitoba.—The contract for grading the extension of this road from its present northern terminus at Sifton, in Manitoba, north 23 miles to a point on Lake Winnipegosis, near the mouth of the Mosay River, has been given to Niel Kieth, of Winnipeg, Man., and work is to be begun at once. Mr. R. J. McKenzie will have direct supervision. The road now extends from Gladstone Junction, a station on the Canadian Pacific, northwest 100 miles to Sifton, passing through Dauphin.

Little Rock, Hot Springs & Texas.—Judge John A. Williams, in the U. S. Court at Little Rock, Ark., has authorized John G. Lonsdale, Receiver, to take measures to determine the cost of completing the road, also to negotiate the sale of Receivers' certificates. The company, which was formed by Colonel Uriah Lott, was incorporated in Arkansas, Dec. 9, 1893, to build a road from Little Rock, Ark., west to Wister, I. T., 155 miles, with branches aggregating 160 miles. The road was finished between Benton, Ark., and the Sabine River, 4 miles, in February, 1895, and grading was subsequently carried to Hot Springs, 31 miles from Benton. Surveys have been made between Little Rock and the Territory line. Up to the present time the road has cost about \$500,000. Mr. Lonsdale has been identified with the road since its organization.

Long Island.—An extension of the North Side Division is proposed from Great Neck, L. I., northeast $4\frac{1}{2}$ miles, to Port Washington. A survey of the line was made some years ago, and right of way is now being obtained. President W. H. Baldwin, Jr., states that the work will be done under contract, but will not be started until the company has right of way for the entire line.

Mexican National Construction Co.—President Diaz, of Mexico, has announced that all of the existing concessions for railroads which have been granted to this company have been forfeited for non-fulfillment of the terms of the charters. The company now operates two lines in Mexico, the Zacatecas Division, extending from Zacatecas southeast, 29 miles, to Ojo Caliente, and the Colima Division, from Colima west, 59 miles, to Manzanillo, on the Pacific Coast. An extension of this latter division was proposed from Colima north to Guadalajara. The company is composed chiefly of New York and Boston capitalists.

Milwaukee, Benton Harbor & Columbus.—The portion of this road between Benton Harbor, Mich., and the St. Joseph River, 5 miles, has been completed, and also the new 354-ft. steel bridge over the St. Joseph River. The contract for that portion of the road between the mouth of the St. Joseph River and Buchanan, Mich., 35 miles, is held by the Crouch Construction Co.

Mineral Range.—W. F. Fitch, Marquette, Mich., President and General Manager, states that the company proposes to widen the gage of the road between Houghton and Calumet during this season. The road extends from Houghton, Mich., north 15 miles, into the Keweenaw Peninsula, to Calumet and Red Jacket, and connects at Houghton with the Duluth, South Shore & Atlantic.

Missouri, Arkansas & Southern.—This company has recently been incorporated in Missouri with a capital stock of \$800,000. It is proposed to build a road from McElhany, Newton County, Mo., southeast about 40 miles to a point on the St. Louis & San Francisco, in the northwestern part of Arkansas. The headquarters of the company will be at McElhany. Among the incorporators are D. T. Jackson, W. I. Rush and Z. Schropp.

Mobile, Jackson & Kansas City.—Grading on this road, which is to connect Mobile, Ala., with Jackson, Miss., 180 miles, has been completed nearly to the Dog River, 30 miles from Mobile, and 17 miles of track have been laid. It is expected that the road will be finished and in operation between Mobile and the Dog River by the middle of July. The work on this section of the road is very heavy and has proceeded slowly. One cut on the line is 4,000 ft. long and averages about 28 ft. in depth. This is expected to be finished in about two weeks. Seven trestles have been built, the largest of which is 1,270 ft. long. The contract for the last seven miles of the road to the Dog River is held by C. D. Smith, of Mobile.

Morley & Morehouse.—This company has recently been incorporated in Missouri with a capital stock of \$150,000 to build a railroad from Morley, Scott County, southwest about 16 miles to Morehouse, New Madrid County.

Pittsburgh, Chautauqua & Lake Erie.—Surveys are now being made for this proposed road in western New York state, which is to extend from Chautauqua, on the Jamestown & Lake Erie, south about 15 miles to Brokenstraw, a station on the Erie Railroad. The promoters of the road, who have an office at Mayville, state that the line will be built and ready for business before Aug. 1.

Sierra, Cal.—Tracklaying was completed to Maxwell, about 20 miles east of Oakdale, on June 1, and regular train service has been begun between the points named, passengers and mail being carried from Maxwell by stage to the Sonora Mountain towns. The road is proposed from Oakdale to Coulterville, Mariposa County, via Sonora, with a branch from Sonora north to Angel's Camp and other mining towns. Sidney D. Freshman, Faldale, Cal., is President of the company.

Southern.—It is reported that the company proposes extending the Winston-Salem & Mocksville Division from Mocksville, N. C., southwest to Mooresville, a point on the Charlotte & Taylorsville Division, about 35

miles. If this extension is built it will give a new line between Greensboro and Charlotte, N. C.

Southern Railway of Mexico.—This road is proposed to extend from Oaxaca, the southern terminus of the Mexican Southern, in a general easterly direction through San Jeronimo, a station on the National Tehuantepec, to a point on the Guatemala frontier, where it is expected to connect with a Guatemalan road to be built. A report from Vera Cruz, Mex., states that T. A. McClennan, who is interested in the new road, has purchased certain material at Cleveland, O., for its construction, and is now on his way to San Jeronimo, at which place grading will be begun immediately on his arrival.

Electric Railroad Construction.

Atlanta, Ga.—The Atlanta & Douglasville Railway Co. has been incorporated with a capital stock of \$375,000, by J. S. James, Douglasville; Simon Baer, Atlanta; G. L. Bell, Gainesville; G. F. Payne, Philadelphia; T. L. Galloway and others to build an electric road between the places mentioned in the title.

Auburn, N. Y.—The State Railroad Commission has denied the application of the Auburn & Western Railroad Co., for permission to build an electric road to Seneca Falls. The denial is on the ground that public necessity does not require the construction of the road.

Baltimore.—Thomas C. Basshor & Son have received the contract for supplying a 500-H. P. engine and three 200-H. P. boilers to be placed in the power station at Owens Mills, for the Baltimore & Northern Electric Railway Co. The Laclede Car Co., of St. Louis, will supply 21 cars for the road.

Bradford, Pa.—A large force of men is now at work building the Olean, Rock City & Bradford Electric Railroad, which is to be about 20 miles in length, extending through the three places mentioned in the title.

Bridgewater, Mass.—The Brockton, Bridgewater & Taunton Street Railroad was formally opened June 14. By the completion of this road there is now a direct electric route between Boston and Taunton. The first car left the car-house in this town for Taunton at 9:35 o'clock, and arrived there at 11:05, numerous stops on account of limbs and posts causing considerable delay. The return trip was made in 50 minutes. Regular trips began June 15, and cars will leave Taunton and Brockton on the hour and half hour.

Columbus, O.—The Cleveland & Akron Suburban Electric Railway Co. was incorporated June 15 with a capital of \$500,000 by Harry C. Mason, William C. Gayer, Dr. J. C. Fritch and others.

Doylestown, Pa.—Williams & Boody, 705 Girard avenue, Philadelphia, have been awarded the contract for a power-house to build at Doylestown for the East Penn Traction Co.

Eatontown, N. J.—The Red Bank Trolley Co. has filed its acceptance of the franchise requiring the company to pay one-half the cost of maintaining the streets occupied, besides \$250 annually.

Erie, Pa.—The Erie Electric Motor Co. desires to lay a double-track line on the Lake road.

Meadville, Pa.—The Meadville Traction Co. has been incorporated with a capital stock of \$350,000 by F. R. Shryock, Charles Fahr, G. D. Trowen and others.

New York.—The State Railroad Commissioners have decided favorably on the application of the Metropolitan Street Railway Co., of New York, for permission to build an electric conduit road on the Fourth and Madison avenue lines. Some time ago the commissioners granted permission to change the motive power of the Eighth avenue line, consent of the property owners and the right to tear up the streets has been granted, but a number of injunctions are still pending. Until the company is assured of its right to retain the franchises of the two routes, it is probable that no construction work will be begun. A map showing the routes where it is proposed to change the motive power will be found in the *Railroad Gazette* of March 5.

Oxford, Me.—Fred C. Wilson & Co., of Boston, have secured the contract for building the Oxford Central Electric Railroad, which is to be 17 miles in length, including a 4-mile spur. The road will run direct from Norway to East Stoneham. The power house will be located at Rice's Junction, and will contain four 150-H. P. boilers and two 300-H. P. engines. The boiler and engine-rooms together will occupy 80 x 110 ft. floor space. The railroad commissioners have not as yet approved of the route, but as soon as they have given their consent construction work will be begun.

Pittsfield, Mass.—The Pittsfield Electric Street Railway Co. has decided to buy a plant and furnish its own power to operate the electric road. The change will be made in a few weeks.

Port Jervis, N. Y.—The Milford, Matamoras & New York Railroad Co. has been incorporated to build a road from Matamoras, Pa., to Port Jervis, N. Y. Capital, \$50,000. The directors include: Louis H. Smith, P. O. Deyo and Charles M. Clarke, of New York; L. Monthemont, of Milford; W. K. Ridgway, of Matamoras, Pa., and A. L. Lethridge, of Brooklyn.

Reading, Pa.—Common Council has passed the ordinance giving the traction company a franchise on Third street from Penn to Walnut streets, thence west on Walnut street to Second, thence to Greenwich and connect with the Reading & Temple Railroad.

Roselle, N. J.—The New York & New Orange Railroad Co. was incorporated June 12 for the purpose of building a road from Roselle, N. J., through the town of New Orange, forming a belt line connecting with stations on the Jersey Central, Lehigh Valley, Philadelphia & Reading, Baltimore & Ohio and the Delaware, Lackawanna & Western. The capital stock is given as \$100,000. The officers are: Robert Grimes, Elmira, N. Y., President; Dennis Long, Union, N. J., Vice-President; W. S. McCord, Elmira, N. Y., Treasurer, and C. W. Manahan, East Orange, N. J., Secretary. The directors consist of the above named officers and T. C. English and N. C. J. English, of Elizabeth, and George B. Frost, of Newark.

Scranton, Pa.—Ten double-truck cars, ordered by the Scranton Street Railway Co., will reach the city in about two weeks from Dayton, O. They will be fitted at once for service, and in about a month will be running.

Southampton, L. I., N. Y.—The Highway Commissioners of Southampton have given their consent for building the Riverhead, Quogue & Southampton Railroad through Southampton. The company now has the entire right of way from Riverhead to Westhampton with but one exception.

Titusville, Pa.—Final surveys are being made by Engineer D. F. A. Wheelock, of Warren, Pa., for the electric road to be built by the Titusville Electric Traction Co. As soon as the surveys have been completed, the grading and the construction of the line will begin.

Tonawanda, N. Y.—The Tonawanda Electric Railroad Co., referred to among our notes of June 4, has been granted a franchise. The road must be finished by Feb. 1, 1899, with a forfeiture of \$20,000 in case of failure to comply with this provision.

Tyler, Pa.—The Tylerdale Belt Line Railroad Co. has been incorporated to build an electric road 1½ miles long with a capital stock of \$15,000. The incorporators include Samuel Hazlett and G. L. Hayes.

South Framingham, Mass.—The electric road between Framingham and Framingham Center has practically been completed, and the road will be opened for service within a week or two.

Washington, D. C.—Work was begun on June 9 on the Eighteenth street extension of the Metropolitan Railroad. It is stated that the mile of road which the company's charter requires to be built will be completed in 12 days.

Wickliffe, O.—The Lake County Transit Co. has been incorporated, with a capital stock of \$100,000.

GENERAL RAILROAD NEWS

Boise, Nampa & Owyhee.—At a recent meeting of the Board of Directors held at Nampa, Idaho, the officers of the company were authorized to issue \$915,000 of bonds and to execute a trust deed upon the road as security. The bonds are to be issued at the rate of \$15,000 a mile as the road is built. Up to the present time 22 miles have been completed from Nampa south, so that \$330,000 in bonds will be issued at once. It is stated that the bonds have been subscribed for, and that construction work is to be resumed at once and pushed rapidly.

Central Pacific.—Arrangements have been made to extend the first mortgage gold bonds amounting to \$25,883,000, which will mature Jan. 1 next, for a period of three years at five per cent. with interest payable semi-annually. These bonds now draw six per cent. interest. A syndicate has been formed, headed by Speyer & Co., which has subscribed \$25,883,000, to take up at par such first mortgage bonds as the holders do not desire to have extended. The terms and conditions for this arrangement and the limit date for depositing the bonds are to be announced shortly.

Chicago, Indianapolis & Louisville.—A meeting of the directors and stockholders was held at Indianapolis on June 14, and the filing of a refunding mortgage on the property of the company was authorized. The mortgage will be made in favor of the Central Trust Co., of New York, and will secure an issue of \$15,000,000 of bonds. James Murdock, a director of the company, is made trustee. The new bonds will be dated July 1, 1897, will run for 50 years; and will bear interest at 6 per cent., payable in gold semi-annually. The funded debt of the company, on June 30, 1895, amounted to \$13,500,000. The property which will be covered by the new mortgage includes all the lines of realty and also 10,000 shares of the capital stock of the Chicago and Western Indiana Railroad, and 2,400 shares of the capital stock of the Belt Railroad Co. of Chicago.

Cincinnati, New Orleans & Texas Pacific.—Receiver S. M. Felton has entered suit in the United States Court at Cincinnati, O., against the city of Cincinnati and the trustees of the Cincinnati Southern Railway. The purpose of the suit is to compel the city of Cincinnati to stand the expense of rebuilding parts of certain bridges on the line of the road, namely, several spans of the Ohio River bridge, between Ludlow and Cincinnati, costing \$52,350, three spans of the bridge over the Cumberland in Kentucky, costing \$52,000, and one span of the bridge at Walton, Ky., costing \$7,753. These repairs were made by the Receiver under order of the United States Court, and it is now insisted that under the terms of the lease the city is bound for all repairs of this character. The Court is asked to allow the Receiver to deduct from the rent due the city the amount expended in making repairs.

Columbus, Hocking Valley & Toledo.—Suit has again been brought by the stockholders against Judge Stephenson Burke and his associates, this time in the Common Pleas Court at Columbus, O. The last suit was dismissed by the Circuit Court at Columbus on March 9. The stockholders allege mismanagement on the part of Judge Burke in bonding the property for \$8,000,000, very little of which amount, it is claimed, was ever used in the proposed improvements of the road.

Illinois Central.—The earnings for April and for the 10 months ended April 30 were as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,623,641	\$1,638,741	D. \$15,100
Oper. expen.....	1,262,423	1,203,517	I. 58,906
Net earn.....	\$361,218	\$435,224	D. \$74,006
Ten months:			
Gross earn.....	\$18,561,879	\$18,668,274	D. \$106,395
Oper. expen.....	12,932,993	12,362,842	I. 570,488
Net earn.....	\$5,628,919	\$6,305,432	D. \$676,483

The gross earnings for May, 1897, are estimated at \$1,974,459, against \$1,644,454 for May, 1896, an estimated increase of \$150,005.

A sale of \$3,350,000 3½ per cent. bonds of the company has been made by Kuhn, Loeb & Co., to a syndicate headed by Redmond, Kerr & Co. and Goldman Sachs & Co. These bonds are the \$1,350,000 Chicago, St. Louis & New Orleans first mortgage bonds to be issued Nov. 1 in lieu of maturing divisional 7 per cent. bonds and the \$2,000,000 Springfield Division bonds to renew the 6 per cent. bonds maturing next January.

Northern Pacific.—The earnings for April have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,275,627	\$1,284,493	D. \$8,866
Oper. expen.....	805,608	809,661	D. 4,053
Net earn.....	\$370,019	\$374,832	D. \$4,813
Taxes.....	42,900	35,412	I. 7,488
Balance	\$327,119	\$439,420	D. \$112,301
Other income	12,220	77,177	D. 64,957
Total.....	\$339,339	\$416,597	D. \$77,258

For the eight months ended April 30, the gross earnings were \$12,088,061 and operating expenses \$7,282,622, making the net earnings, \$4,805,439.

Mexican National.—The Mexican National Railway, Limited the depositary company formed in June, 1896,

to represent the second mortgage "A" and "B" bonds of the Mexican National Railway) has issued its first report, covering eight months ended March 31. During the period above stated the amount of interest collected on the second mortgage "A" bonds was about \$250,000, which was distributed in turn as a dividend on the \$10,500,000 "A" certificates of the new company, comprising the earnings for the whole year 1896, though the new company was in existence for only eight months. The "A" bonds on which the dividend has been paid, as above stated, are the prior issue of the limited company, and are entitled to 5 per cent. dividends.

San Antonio & Gulf.—The Texas Railroad Commission has authorized this company to issue stock to the amount of \$1,000 per mile on 32 miles of road and bonds to the amount of \$15,000 per mile on 28 miles of road. The road, which now extends from San Antonio to Sutherland Springs, Tex., 28 miles, is to be extended from the latter place to Galveston, and contracts for a part of the new line were let about two months ago.

Union Pacific.—The earnings of the entire system for April and for the four months ended April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,295,689	\$1,143,403	I. \$152,286
Oper. expen.....	920,308	777,369	I. 142,939
Net earn.....	\$375,381	\$371,034	I. \$4,347
Four months:			
Gross earn.....	\$5,090,504	\$4,576,341	I. \$514,163
Oper. expen.....	3,330,317	3,155,915	I. 224,402
Net earn.....	\$1,710,187	\$1,420,426	I. \$289,761

UNION PACIFIC PROPER.

April:	1897.	1896.	Inc. or Dec.
Gross earn	\$1,10,479	\$988,358	I. \$117,120
Oper. expen.....	757,406	616,816	I. 140,589
Net earn.....	\$348,073	\$371,542	I. \$23,469
Four months:			
Gross earn.....	\$4,223,531	\$3,923,061	I. \$300,470
Oper. expen.....	2,793,629	2,652,552	I. 141,077
Net earn.....	\$1,429,902	\$1,270,509	I. \$159,393

Wheeling & Lake Erie.—Judge Taft, at Cincinnati, has given an order directing that the Receivers issue certificates to the amount of \$432,500. Of this amount \$165,000 is to be used for bridges, \$85,000 for a new draw span for the Maumee bridge, \$80,000 for rebuilding that bridge and repairs to other large bridges, and \$50,000 to rebuild short creek bridges; \$100,000 is to be used for new rails and sidings, and the balance for miscellaneous work. It is understood that the Receivers will issue the certificates and begin work on the betterments at once.

Electric Railroad News.

Gettysburg, Pa. The property and franchise of the Gettysburg Electric Railroad Co. was bought by a committee of the bondholders, consisting of Max Riebeck and Luther S. Bend, for \$50,000, on June 10. The capital stock of the road was \$200,000. Eight miles of track have been completed for some time and the powerhouse is a substantial and attractive building. The receivers were appointed in September, 1895.

St. Louis.—At a meeting of the People's Railway Co., held June 5, A. Gehner, Charles Parsons and L. M. Rumsey were appointed trustees to bid for the road in the interest of stockholders when it is sold at auction by order of the court on June 29.

Toronto, Ont.—The Toronto Street Railway Co. is appealing to the County Court against the assessment upon poles, wires and rails. The company was successful last year in a similar appeal, two judges upholding its contention. Since then a decision has been given by the Supreme Court upon the law of assessment, which, the Corporation Counsel contends, overrides the ruling of the County Court. The appeal will be heard on June 25.

TRAFFIC.

Traffic Notes.

The weighing bureau at Terre Haute, Ind., saved over \$7,000 in the month of May.

Press dispatches from Montreal report that both the Canadian Pacific and the Grand Trunk are experiencing a marked increase in freight business.

The managers of the Joint Traffic Association have recommended that the fare from St. Louis to New York, via Cincinnati, over both the Baltimore & Ohio and the Chesapeake & Ohio be \$20.50 (first-class, limited).

The Chicago & Alton announces through sleeping cars to San Francisco over the Missouri Pacific, the Texas & Pacific and the Southern Pacific, to run through in about 15 hours quicker time than under the present schedule.

Officers of the New York Central tell the reporters in New York City that the Central will establish cab service to and from the Grand Central Station, similar to that lately introduced in New York City by the Pennsylvania Railroad.

Since the action of the Oregon Short Line in diverting to the Rio Grande Western some of the business which formerly went over the Union Pacific, the latter road has not only put on through sleeping cars to Portland, via Sacramento, but also runs a daily tourist car line over the same route; and has put on a fast westbound freight train from Omaha to Ogden.

The New York Commercial Bulletin of recent date states that the Tennessee Coal, Iron & Railroad Company has lately shipped 1,000 tons of iron at Norfolk for Hamburg; 1,000 tons at New Orleans for Glasgow; 1,500 tons at Port Royal for Liverpool. The Hamburg and Glasgow iron is to be shipped from Birmingham; the 1,500 tons for Liverpool goes out from South Pittsburgh by the Nashville, Chattanooga & St. Louis to Atlanta.

Mr. C. W. Bunn, General Counsel of the Northern Pacific, announces at Seattle that the road will reduce its freight rates in conformity with the law recently passed in the state of Washington. The decrease in revenue will be serious, but the company is ready, says Mr. Bunn, to do all in its power to promote the prosperity of the people of Washington. On wheat from the Palouse country to the coast the rate, which is now \$4.75 per ton, will be reduced to \$4.25. On other farm products the reduction is 15 per cent. As first proposed the legislative bill required much more radical reductions.

Chicago Traffic Matters.

CHICAGO, June 16, 1897.

Wholesale manipulation of "teachers' tickets" from St. Paul through Chicago to New York, Boston, Port-

land and other Eastern points has created a considerable sensation the past week, and the Chicago market is flooded with tickets that will probably disturb the Eastern passenger market during the entire summer. It is asserted that the Chicago, Milwaukee & St. Paul has broken away from the Western passenger agreement by entering into a deal with the ticket brokers, and yesterday consternation reigned among all the Northwestern and Eastern roads. There are said to be in Chicago 700 or 800 tickets of the St. Paul issue, reading from St. Paul to the eastern points named, good until Sept. 1. They are without any restrictions whatever, and read from Chicago over the Nickel Plate, the Erie and the West Shore, and a few scattering tickets are obtainable over the Wabash, the Baltimore & Ohio and the Grand Trunk. Brokers are quoting a \$38 rate to New York with a \$23 rebate. Tickets were originally issued for the St. Paul and Minneapolis teachers, but the dates for the sale of those tickets came to an end on Sunday and it is alleged that two brokers brought 400 other tickets to Chicago, and placed them on sale here, clipping off the C., M. & St. P. going coupon. An effort is being made to get the tickets called in, but with what success is not yet apparent.

After seven days of investigation of the alleged cutting of grain rates the Interstate Commerce Commission closed its hearings June 12. The general opinion seems to be that the Commissioners were disappointed at the result attained. They depended on the Board of Trade men for evidence of violations of law, but the shippers to a man testified that they had no knowledge of any cut rates or rebates being paid. It is said, however, that some of the witnesses might have told of rate cutting if they had chosen to do so; evidently they preferred to keep on good terms with the railroads which had favored them. Officers of several roads gave evidence concerning the practice of Chicago roads in leasing grain elevators to shipping firms at nominal rentals. Mr. Clark, General Western Freight Agent of the Lake Shore & Michigan Southern, who testified before the Commission on Thursday, read the following arbitrators' award:

After due consideration of the arguments presented and the statistics of traffic forwarded in the past, the arbitrators' award is that eastbound shipments of live stock and dressed meats from Chicago and Chicago junctions, included in this reference, reduced to an equivalent of sixth-class tonnage basis, be apportioned between the lines in interest from and after Sept. 1, 1896, as follows:

	Per cent.
Baltimore & Ohio.....	4.5
Cleveland, Cincinnati, Chicago & St. Louis.....	1.1
Chicago & Erie.....	9.4
Chicago & Grand Trunk.....	12.2
Lake Shore & Michigan Southern.....	16.1
Michigan Central.....	16.1
New York, Chicago & St. Louis.....	11.3
Pittsburgh, Cincinnati, Chicago & St. Louis.....	10.7
Pittsburgh, Fort Wayne & Chicago.....	8.7
Wabash.....	5.2
Total.....	100.0

And that the eastbound dead freight tonnage from Chicago and Chicago junction points covered by this reference, reduced to an equivalent of sixth-class basis, be apportioned between the lines in interest from and after Sept. 1, 1896, as follows:

	Per cent.
Baltimore & Ohio.....	8.0
Cleveland, Cincinnati, Chicago & St. Louis.....	5.8
Chicago & Erie.....	11.2
Chicago & Grand Trunk.....	11.0
Lake Shore & Michigan Southern.....	14.2
Michigan Central.....	15.6
New York, Chicago & St. Louis.....	8.2
Pittsburgh, Cincinnati, Chicago & St. Louis.....	5.0
Pittsburgh, Fort Wayne & Chicago.....	14.2
Wabash.....	6.6

J. F. GODDARD,
GARRET A. HOBART,
E. H. LEONARD,
Arbitrators.

Mr. Clark said that in pursuance of this agreement the Lake Shore & Michigan Southern had diverted to the New York, Chicago & St. Louis from Feb. 26 to April 1, 1897, 364 cars, containing 12,466,140 lbs.

The Union Pacific has given 30 days' notice of withdrawal from the Western Passenger Association. The cause of the withdrawal is the old fight over the divisions to be allowed the Oregon Short Line. When the Short Line was reorganized it asked the Rio Grande Western and the Denver & Rio Grande if they would allow it the same divisions that it had been receiving from the Union Pacific, and these roads said that they would do it. Yesterday, in the meeting of the Trans-Missouri lines, the Union Pacific demanded that these two roads should not pay to the Short Line the same percentages which it had paid.

The Central Passenger Association Mileage Bureau is to begin business August 15 instead of July 1. Eastern roads have also agreed to place on sale a new 1,000-mile interchangeable mileage book, to be sold for \$30 with a \$10 rebate. Western lines have appointed a committee to arrange details for placing on sale an interchangeable mileage book, probably a 3,000-mile book.

It is openly asserted that several of the Western lines in their rush to get Christian Endeavor business are disregarding the provision that no sleeping car shall be allowed for parties of less than 25.

The small business centers in the West are earnestly protesting to the Western Passenger Association against the placing on sale of low rate "distributors' tickets" asked for by the Merchants' National Association. The claim is made that by favoring the larger cities in this matter, the railroads will hurt the smaller cities.

Eastbound shipments from Chicago and Chicago Junctions to points at and beyond the Western terminus of the trunk lines for the week ending June 10 amounted to 59,216 tons, as compared with 52,952 tons the preceding week. This statement includes 22,932 tons of grain, 2,609 tons of flour and 11,163 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	WEEK ENDING JUNE 10.		WEEK ENDING JUNE 3.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio.....	4,579	7.7	4,046	7.6
C., C. & St. Louis.....	2,871	4.9	2,987	5.6
Erie.....	7,616	12.9	6,126	11.6
Grand Trunk.....	6,343	10.7	4,215	7.9
L. S. & M. S.....	5,000	8.4	4,859	9.4
Michigan Central.....	6,634	11.2	8,571	16.2
N. Y., Chi. & St. L.....	6,604	11.2	4,910	9.3
Pitts., Cin., Chi. & St. Louis.....	5,797	9.8	4,938	9.3
Pitts., Ft. Wayne & Chicago.....	8,140	13.7	6,813	12.9
Wabash.....	5,632	9.5	5,387	10.2
Totals.....	59,216	100.0	52,952	100.0

Lake shipments last week were 100,521 tons.